MARINE REVIEW.

VOL. XVI. CLEVELAND, O., JULY 22, 1897. No. 4.

Contract for a Steel Tow Barge.

The Chicago Ship Building Company has joined the list of occupied ship yards by taking an order for a steel tow barge, the largest on the lakes. She will be almost a duplicate of the Amazon which established the 6,000 ton cargo record from Lake Superior. The difference will be an addition of 2 feet to the beam. She will be built to the order of a Cleveland and Chicago syndicate and her dimensions will be as follows: Keel 376 feet, beam 48 feet, depth 26 feet and water bottom 4½ feet. This makes the fourth large lake ship yard to secure contracts that will afford work for a good part of the summer

Lake Freight Matters.

Chicago grain shippers are talking tonnage pretty freely at the best rates that are being paid on the lakes, but otherwise the lake freight market is, if anything, in worse shape than it was a week ago. The rate on wheat from Duluth to Buffalo dropped to one cent, and the fact that such a rate is offered plainly shows the condition of the ore freight market. One cent on wheat is not equal to 38 cents on ore. Although the mines that were flooded last week are again shipping, ore is not coming into ports at the head of the lakes fast enough to create much demand for wild tonnage, and some shippers have more than they can do to take care of their contract boats. Cargoes are very scarce at all the Lake Superior ports and much time has been lost by boats that were sent up without being chartered. The feeling is weak but large shippers show no disposition to force rates lower, as that would only tie up the most of the wild carriers as some of them are losing money on the present carrying charges. The active movement of grain at Chicago has kept the supply of Lake Michigan tonnage cleaned up pretty well and cargoes have not been so hard to get at Escanaba. Many of the large lone steamers that usually trade to Lake Superior have been put in the Chicago grain trade during the past week.

The coal situation is about the same as it was at the close of last week. Leading shippers do not look for a settlement of the strike before August 1, and it will be a week or ten days later before there will be any great demand for coal tonnage. To outsiders dock men are charging $2.30 a ton for fuel.

The Plant Line Steamer La Grande Duchesse.

The Review presents as a supplement this week an illustration of the finest Atlantic coast steamer. The plant lines operates, in connection with its railway, steamers between Tampa, Key West, Mobile and the West Indies, and also a line from Boston to Halifax and other provincial points, thus connecting three great nations. The Grande Duchesse presents the latest features in naval architecture and marine engineering, having been built by the Newport News Ship Building and Dry Dock Co. She is 404 feet over all, 380 feet between perpendiculars, and 47 feet 9 inches beam. The greatest beam is 25 feet forward of the middle of the vessel. The 7,000 horse power is developed with twin-screw quadruple expansion engines, having cylinders 24, 34, 48 and 68 inches by 42 inches stroke. Steam is furnished at 225 pounds pressure by Babcock & Wilcox water tube boilers. Her required speed of 17 knots was exceeded by a half knot during the trial and she has made as high as 18 knots. The upper berths turn up as in a sleeping car and the finishing and furnishing is said to be finer than most Atlantic liners. She is designed so that she can readily be turned into a cruiser in case of war. The rudder stock cranks and propeller shafts are of compressed steel manufacturd by the Bethlehem Iron Co. The steering apparatus was furnished by Williamson Bros., Philadelphia. It is operated by a telemotor. Providence capstans and windlasses complete this part of the outfit. The system of ventilation was put in by the B. F. Sturtevant Co., Boston, Mass. A Baird evaporator, See's ash ejector and Katzenstein's packing are features of the steam plant, and the piping and boilers are protected with Magnesia sectional covering.

Progress in Marine Engineering.

Some idea of the progress in marine engineering during the last few decades may be gathered from the fact that in 1840 a pound of coal propelled a displacement weight of 0.578 tons eight knots, but the earning weight was only one-tenth of this, as 50 per cent. of the displacement represented the machinery and fuel, 40 per cent. the hull, and 10 per cent., or 0.057 tons, the cargo; in 1850, with iron vessels and the screw propeller, a displacement weight of 0.6 ton was propelled nine knots by the pound of coal, but the proportion of cargo had risen to 27 per cent., or 0.16 ton; in 1860, with high boiler pressure and the surface condenser, 0.82 ton displacement was propelled ten knots, and the cargo was 33 per cent. or 0.27 ton; in 1880, in the freight steamer, 2.1 tons displacement was propelled ten knots, with still 50 per cent., or 1.05 tons of cargo; in 1895 there were two classes of freight boats, the "tramp" propelling thirty-four displacement tons eight and a half knots, with 70 per cent., or two tons of cargo, while at the same time the huge cargo steamers of the North Atlantic were driving a displacement of 3.16 tons twelve knots, with 55 per cent., or 1.7 tons of cargo—on the express passenger steamers, too, the cargo weight being down to 0.09 ton per pound of coal.

Notices to Mariners.

Notice is hereby given that a lighted buoy, painted black, has been placed on the reef W. N. W. of Rock island light-house in St. Lawrence river near the black spar buoy No. 23. This buoy flashes white every alternate ten seconds. Also, that a lighted buoy, painted red, has been placed at the entrance of Ogdensburg harbor near the red spar buoy No. 2. This buoy shows a fixed white light. The spar buoys near these lighted buoys will soon be removed. Notice is also given that the following lighted buoys will be exhibited as soon as practicable after this date: viz.: In the St. Lawrence river, near the black spar buoy No. 17. S. W. of Sunken Rock light-house, a buoy painted black flashing white every alternate ten seconds. In the St. Lawrence river near the black spar buoy No. 25 making the N. W. side of Feather Bed shoal, a buoy painted black flashing white every alternate ten seconds. In Lake Ontario near the second class can buoy now marking the Charity shoal, a buoy, painted red and black in horizontal stripes, showing a fixed white light. The spar and can buoys now at the above named points will be removed as soon as practicable. It is the intention of the Light-House board to mark the rock in the soutwestern entrance of the Lower Narrows (to the north and west of Brock's group) by a lighted buoy of which due notice will be given.

On July 5, 1897, a red gas buoy, showing a fixed white light, was established on the northerly side of the channel and the southerly side of the middle ground in the head of the St Mary's river, about 1⅓ miles west-northwesterly from Round island, in place of the former Middle ground buoy, No. 68.

On July 4, 1897, a black and white perpendicularly striped gas buoy, showing a fixed white light, was established in Mud lake, St. Mary's river, at the intersection of the range lines marked by the Pilot island and Winter Point range lights, in place of the former Mud lake turning buoy.

On July 4, 1897, a black gas buoy, showing a fixed white light, was established on the westerly side of the channel in the northerly end of Little Mud lake, St. Mary's river, to mark the beginning of the turn into Hay Lake channel, in place of the former entrance buoy, No. 1.

On July 2, 1897, a black gas buoy, showing a fixed white light, was established on the easterly edge of the middle ground off the mouth of the Black river and Port Huron, northerly end of the St. Clair river, in place of the former Black river shoal buoy, No. 1.

Notice is hereby given that, on or about July 20, 1897, the color of the buildings at this station, on the extreme north point of Milwaukee bay, will be changed from brown tower and white dwelling to buff tower and dwelling, with a red roof on the dwelling.

NAVAL ARCHITECTS AND MARINE ENGINEERS.

OVER 800 OF THE PRINCIPAL AND REPRESENTATIVE MEN OF THESE PROFESSIONS GATHERED IN LONDON DURING THE JUBILEE. ROYAL ENTERTAINMENT IS PROVIDED. ADDRESSED BY THE PRINCE OF WALES AND RECEIVED BY THE QUEEN. LIST OF AMERICAN REPRESENTATIVES.

Special Correspondence from the Editor of the Marine Review.

London, July 6—It has been said that in most of the festivities attending the celebration of the jubilee in this country the Britishers are bounded by the horizon of the queen's empire. This claim certainly does not apply to the congress of naval architects and marine engineers, which was opened at the Hotel Cecil, London, with a reception last evening. It is an international affair in every sense of the word. The list of delegates includes representatives from almost every nation on the face of the globe, and as the guests of the Institution of Naval Architects, they are being entertained on a grand scale. Many of them were here in time to witness the naval review and they were so deeply impressed with the thirty miles of Queen Victoria's navy that they never seem to tire of talking about it. The people of this country certainly have a right to be proud of the jubilee and proud also of the wonderful history that has made it possible. Such homage as that accorded to the queen within the past few weeks has never before been paid to any living man or woman.

The congress of naval architects is entirely in accord with the elaborate programmes attending all of the celebrations. At the Hotel Cecil, last evening, the guests, to the number of upwards of 800, were received by Lord Hopetoun, the president of the institution, and the reception committee included the Lord Mayor of London, together with a large number of distinguished representatives of the government and the ship building industry of the country. Music was furnished by the string band of the Royal Artillery. A majority of the foreign delegates are from the continent, France and Germany particularly, as in these two countries in 1895 and 1896 the members of the British society were handsomely entertained, and the present meeting is in part a return for hospitality shown at Paris, Hamburg and Berlin.

REPRESENTATIVES FROM THE UNITED STATES.

Direct representatives of the United States navy are Naval Constructor D. W. Taylor, and W. M. McFarland from the engineer corps. Lieutenant J. C. Colwell, the United States naval attache in London, is also in attendance. One of the venerable delegates, also from our country, is Mr. C. H. Haswell of New York, who was the first engineer in chief of the United States navy and who is probably the oldest practicing engineer in the world. Always loyal to his chiefs and mindful of the respect that is due to the old engineers of the navy, Mr. McFarland took occasion at one of the meetings to introduce Mr. Haswell and refer to his long service as an engineer, which began in 1822. His life covers the entire history of marine engineering, away back to the old Clermont on the Hudson, which he saw when a boy. Among members of the American Society of Naval Architects and Marine Engineers who accepted invitations to the congress, and most of whom are here, are the following: Mr. Charles Cramp, Mr. W. H. Shock, Mr. J. Arsenius, Mr. W. Irving Babcock, Mr. J. De Rycke, Mr. C. H. Haswell, Mr. R. J. Hawes, Mr W. P. Henry, Mr. T. W. Hyde, Mr. W. H. Jaques, Mr. D. G. Moore, Mr. M. F. Moore, Mr. J. R. Oldham, Mr. C. W. Pusey, Mr. W. W. Pusey, Mr. T. G. Roberts, Mr. H. E. Rottmer, Mr. J. Snan, Mr. W. L. Sonntag, Mr. A. Sperry, Mr. W. H. C. Swensen, Mr. J. E. Thayer, Mr. F. Van Vleck, Mr. Charles Ward, Mr. F. M. Wheeler and Mr. W. W. Bates.

WELCOMED BY THE PRINCE OF WALES.

On Tuesday morning July 6, occurred the formal opening of the congress by the Prince of Wales, honorary president, at the Imperial Institute, South Kensington. The prince was received at the main entrance by the Earl of Hopetoun, president of the society of naval architects, and was escorted to the Great Hall of the Institute, where the large and distinguished audience arose upon his entering. He was accompanied by the Duke of Coburg and Duke of York. The first lord of the admiralty, Right. Hon. George J. Goshen, M. P., was accorded a place of honor on the platform. Several members of the House of Lords and distinguished representatives of Her Majesty's navy were also amongst the company. A few of the distinguished representatives of European governments noted in the assembly were: Colonel E. E. Gonlaeff, chief naval constructor, Russia; Senor Don Jose Torello, engineer inspector of the Royal Spanish navy; Count E. H. A. Morner, marine engineer, Sweden; Rear Admiral Bendemann, German Navy; Dr. Versmann, president of the senate; Admiral Stockhuysen, Chief of the Marine Staff, Holland; Captain Chevalier A. Blanco and Colonel Nabor Soliani, director of naval construction, Italy; Mr. H. Kurobe, chief inspector of construction, Japan; Captain C. J. Bloerch, Royal Norwegian navy; Vice Admiral C. Duprene, of the French ministry of marine; and representatives were also present from Argentina, Austro-Hungary, Belgium, Brazil, Chili, Denmark, and numerous commercial bodies of France and Germany.

The Prince of Wales made a short address, welcoming the guests, not only in his own name, but in the name of the queen. He said he was aware that the progress of ship building as an industry is of the greatest importance, and it is essential in promoting the commerce of the world and the prosperity of nations. He congratulated the congress on the great strides that had been made in marine engineering and naval architecture during the last sixty years. The first lord of the admiralty, Mr. Goshen, also delivered a short address, and Lord Hopetoun, president of the congress, thanked the prince and the distinguished company for their presence. He also spoke at some length of the development of the mercantile marine and the navy within the last half century. A telegram of congratulation was sent to the queen and the royal party then departed, leaving the congress to take up the reading and discussion of papers. It was announced that the guests as well as the members of the institute would on Saturday afternoon be received by the queen at Windsor.

PRIVATE ENTERTAINMENTS AND PLEASURE EXCURSIONS.

The reception by the Queen is only one of numerous private entertainments of a rare kind provided for the delegates. These include a reception by the Lord Mayor and Lady Mayoress of London; a dinner at King's Hall, Holborn restaurant, and a reception at the admiralty by the first lord of the admiralty, Right Hon. G. J. Goshen, and Mrs. Goshen. Later in the week the programme includes an excursion by steamer to the London and St. Katharine docks, the Royal Albert dock, the Victoria dock and the Thames Iron Works, followed by a festival concert and supper at Queen's Hall, Langham place. The orchestra at this concert will be composed of 110 past and present members of the Royal College of Music. The chorus to the number of 235, will be selected exclusively from the famous Leeds festival chorus of 1895, which includes contingents from Leeds, Bradford, Huddersfield, Halifax, Dewsbury and Batley. These will be organized, with the express sanction of the committee of the Leeds musical festival. The Leeds festival chorus has never before sung in London. The programme is to be of an international character. Another day will be devoted to a visit to Portsmouth dock yard and the Southampton docks, for which special trains and a large steamer are provided, and upon the return to London another reception will be tendered the guests by Hon. T. A. Brassey and Lady Idina Brassey. It is proposed to conclude the week's proceedings in England, after the visit to Windsor, by a dinner at the "Star and Garter" hotel, Richmond, and after the dinner a river fete and a great display of fireworks and illuminations will be arranged. Special trains are provided to convey the guests to and from Richmond. In the following week the guests are to visit the works of the Fairfield Co. at Glasgow, of Messrs. Wm. Denny & Bros. at Dumbarton and of Sir W. G. Armstrong Whitworth & Co. at Newcastle-on-Tyne.

J. M. Mulrooney.

Unclaimed Letters.

Letters addressed to the following persons remain uncalled for at the marine postoffice, Detroit, Mich.: I. I. Barnes; John Bernard—2—Str. Preston; Chas. Bates; T. C. Bennett—Str. India; Harvey Bush—Schr. L. W. Drake; John Bagner—Schr. A. W. Knight; Soren Blom; Capt. C. Chamberlain; Wm. Crowl—Str. Preston; Alex. Cunning; A. Carlisle; Jno. Christie; Jno. Conley; D. A. Dunlap—Str. India; David Davis—Str. W. B. Morley; Gus Dawson; Jesse Frenzen—Str. Appomatox; Jas. B. Foote; Jas. Falconer; Hurb Fraser; Robt. Harris—Str. J. D. Marshall; Chas. W. Hamacker; Richard Hardick—Str. Republic; Capt. Geo. Kunna—Schr. Northington; E. N. Lee—Str. Vulcan; Peter Lavely; Geo. Miller—Str. India; Henry L. Mitchell; John N. Outhwaite; Jno. Redford; J. Realff; Jas. Roach—Yct. Azalea; H. Stakke; J. H. Shaffer—2—Bge. T. H. Foster; Jos. Szat—Bge. A. B. Norris; Capt. Ed. Streffelbean; Gabriel Smith; D. Taylor—Str. Republic; George Turner; Geo. Taylor; Mrs. Nellie Van Gorder.

Work of a Canadian Ship Yard.

The Victoria, a light draught passenger side wheel steamer, is nearing completion on Pembroke lake, Pembroke, Ont., Canada, being built by the Polson Engineering and Shipbuilding Company, Toronto. The vessel is 125 feet over all, 21 feet wide, 32½ feet over guards and 7 feet deep. The frames are of angle iron 3 inches by 2½ inches by 5-16 inches. Reverse frames are 2½ inches by 2½ inches by ¼ inch (doubled in way of engines and boilers) shell plating ⅜ inch thick, reduced to ¼ inch at the ends. There being no inlet to the Pembroke lake the vessel had to be conveyed there in parts on the cars. The Victoria is named after the queen and will probably take the place of the Ottawa which runs between Pembroke and Des Joachims, a distance of sixty miles calling at all the summer resorts on the lake. The freight and passenger traffic is extensive in the summer months, after which the vessel will go into the raft towing business. The building of this vessel is considered a very rapid piece of work, the steel work taking only twelve days to mark, punch and erect in place in Toronto. The work at Toronto was done by the job by Wm. Potts, at one time assistant superintendent with the American Steel Barge Co., West Superior, Wis. The Polson company has on hand at their ship yard, the Knapp roller boat, which is also being done on the contract system similar to the British system of ship building.

Speed and Cargo Records—Lake Freight Steamers.

Cargoes do not seem to be counted large unless they come near the 6,000 ton mark. The Polynesia is believed to have capped the climax with her cargo. The Carnegie continues to stretch herself a little. The cargo record is changed accordingly

Iron Ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Crescent City, A. B. Wolvin of Duluth, 4,954 gross or 5,548 net tons, Two Harbors to Cleveland; Polynesia, James Corrigan, Cleveland, 6,134 net tons iron ore, Duluth to Lake Erie, draft 16 feet and 16 feet 7 inches; Andrew Carnegie, Wilson Transit Co. 5,160 gross tons ore, Two Harbors to Conneaut.

Grain—Schooner Amazon, James Corrigan of Cleveland, 217,000 bushels of corn, equal to 6,076 net tons, Chicago to Buffalo, 16 feet 6 inches draft. From Lake Superior—Steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 171,000 bushels of oats, 51,000 bushels of wheat and 55,000 bushesl of barley, equal to 5,586 net tons, Duluth to Buffalo, 16 feet 1½ inches draft; steamer Crescent City, A. B. Wolvin of Duluth, 318,000 bushels of oats, equal to 5,088 net tons, Duluth to Buffalo.

Coal—Schooner Aurania, John Corrigan of Cleveland, 5,187 net tons bituminous, Toledo to Milwaukee; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 4,997 net tons of bituminous, Cleveland to Sheboygan, draft of 15 feet 2 inches.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour: Centurion, Hopkins Steamship Co. of St. Clair, Mich, Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour; City of Buffalo, Cleveland to Put-in-Bay, 64 miles, 2 hours and 50 minutes, 22.58 miles per hour.

Traffic on the Great American Lakes.

Five years ago there was not a vessel on these lakes that displaced 5,000 tons when floating on the St. Mary's river. To-day there are not fewer than twenty high-powered steel screw steamers which displace about 8,500 tons on the same draft of water. This represents an average increase in the carrying capacity of no less than 70 per cent., and the percentage increase in register tonnage is still higher. Steel cargo steamers, 415 feet in length, and 48 feet in breadth, are now being constructed.

These dimensions are greater than those of the average modern ocean steamer, though several British cargo steamers are about one hundred feet longer and their depth and draft of water is much greater. The carrying capacity of this new lake fleet will equal 3,500,000 tons of ore, transported from the head of Lake Superior to Lake Erie in one season of navigation.

It is well known that the number of vessel passages through the St. Mary's Canal is much larger than the number of vessel passages through the Suez Canal per annum, the number of such passages being as follows: Suez Canal, 3,434 steamers; Soo Canal, 17,956. The tonnage of the former is 8,448,246, and of the latter, 16,806,781 tons. Thus, it is seen that the tonnage passing the Soo Canal during only seven months of a year is 99 per cent. greater than the tonnage passing the Egyptian canal in twelve months.—J. R. Oldham, in the Marine Number of Cassier's Magazine.

First Echoes from the '97 Blue Book.

Copies of the 1897 Blue Book, published by the Marine Review, Cleveland, were sent to subscribers and advertisers last week and comments are being made on it. It was noticed generally in trade papers and all the principal lake papers gave it liberal mention. The Marine Journal, New York, headed their notice, "A book that all hands need." It was said in one daily paper that it was to American shipping what Lloyd's register was to British shipping. London Engineering paid the '96 Blue Book a similar compliment, and now that the '97 edition covers the whole United States, it is certainly true.

H. E. Schmuck, Springfield, Mass., who is interested in lake vessels and is thoroughly posted in the business, makes the following comment: "I am in receipt of the '97 Blue Book and desire to express my appreciation of the additional information contained therein. The book is up-to date in all respects and contains much valuable information which was not in the book published a year ago. I am glad to see that both the gross and net tonnage is given in the list of vessels as it is many times a great convenience to know both of these. This book cannot fail to be a valuable help to anyone interested in marine matters."

Additional orders are beginning to come in, and it is not improbable that the entire edition will be exhausted in the next six months. The following telegram, received from Washington, Tuesday, indicates the wide circlation it will have: "Please mail three copies of your Blue Book of American Shipping to the Burea of American Republics." It was signed by the director, Joseph P. Smith. These books will no doubt be used to show South Americans the facilities for building their ships, and also the products of United States ship yards, so handsomely illustrated in the book.

The Providence Outfit for Tug Boats.

A month or six weeks ago the American Ship Windlass Co., of Providnece, R. I., received an order from F. W. Wheeler & Co., of West Bay City, Mich., for the complete outfit for the large, magnificent tug boat which they are building for W. G. Wilmot & Co., of New Orleans. This outfit is what is called the Providence tug boat oufit, and consists of a Shaw and Spiegle steam towing machine, a Providence patent steam pump brake windlass with iron towing bitts, and a large steam capstan aft. Last week the American Ship Windlass Co. received an order for a duplicate of the above outfit for the large tug building by F. W. Wheeler & Co., for W. Barry Brown & Brother, of Pittsburgh, Pa. This latter tug is 156 ft. long, and will be the largest tug in the world. The tug for W. G. Wilmot & Co. is 145 ft. long, and they will be as fine tug boats as were ever turned out by any ship builders in the world. This outfit enables towing to be done with fewer men, and in less time, and with less expense, and with greater safety than any arrangement that has ever been used or invented the world over. It is the latest and best arrangement that has ever been conceived. The barbarous and expensive old-fashioned methods for towing are destined soon to be a thing of the past.—Marine Journal.

The most famous light-house the world has ever known was the light-houses of Pharos, on the eastern end of the island of that name in the Bay of Alexandria. It was commenced by Ptolemy Soter and finished by his successor, Philadelphus. It was 400 feet high and cost about $1,240,000. The oldest light-house is at Corunna, Spain. It was built in the reign of the Emperor Traffian. England and France have towers that were originally erected by their Roman conquerors. There are now in the world about 6,000 light-houses. Europe has 3,309, North America 1,329, Asia 476, Oceanic 319, Africa 219, South America 169 and West Indies 106.

Eight dollars from Cleveland to Mackinac and return, $7 from Toledo to Mackinac and return, $6 from Detroit to Mackinac and return: The foregoing special tourist rates will be put into effect June 20th, via Detroit & Cleveland Steam Navigation Co.'s new mammoth steel passenger steamers. The round trip from Cleveland, including meals and berths, costs $16, from Toledo $14, from Detroit $11.50. Send 2 cents for illustrated pamphlet. Address A. A. Schantz, G. P. A., Detroit Mich.

Grain and Flour Shipments by Lake.

From the 1897 Blue Book of American Shipping, Copyrighted.

If we reduce flour to bushels of wheat, it is found that the movement of grain eastward by lake in 1896 aggregated full 300,000,000 bushels, and of this amount Buffalo received 215,352,734 bushels. The following summary show shipments of 299,112,968 bushels. To this must be added quite a large item of flour and grain from Gladstone and two or three less important ports that ship odd cargoes of which there is no record, so that there is no question of the total reaching full three hundred millions. Figures representing the Lake Superior movement of grain and flour are those prepared by canal officials at Sault Ste. Marie. They cover shipments from all Lake Superior ports. The Chicago total covers both Chicago and South Chicago and is from the report of Secretary Stone of the Chicago board of trade. Milwaukee, Toledo and Detroit items are also from reports of boards of trade.

	Bushels.
From Lake Superior ports, including flour as grain	135,118,824
" Chicago " " " "	122,868,615
" Milwaukee " " " "	22,500,000*
" Toledo " " " "	11,125,529
" Detroit " " " "	7,500,000*
*Partly estimated.	299,112,968

Although the proportion of this grain and flour that reaches the seaboard through the Welland and St. Lawrence canal routes makes up a very large business, it will be noted that full 70 per cent. of it is transferred at Buffalo for shipment to the coast, via the Erie canal and the several railroads running east from that port. A few other Lake Erie ports, notably Sandusky, Fairport and Erie, afford facilities for the transfer of grain and flour to railways, but their proportion of the business is very small as compared with Buffalo. Thirty-eight elevators in Buffalo have a total storage capacity of 16,650,000 bushels. Three modern elevators now under construction (July, 1897) will increase the grain handling facilities of the port about 25 per cent. Buffalo also has six transfer towers and eight floating elevators.

	1896.	1895.	1894.
Wheat, bushels	63,256,463	46,218,250	34,869,483
Grain other than wheat, bushels	27,448,071	8,328,694	1,545,008
Total, bushels	90,704,534	54,546,944	36,414,491
Flour, barrels	8,882,858	8,902,302	8,965,773
Total grain, including flour as wheat	135,118,824	99,058,454	81,243,356
	1896.	1895.	1894.
Wheat, bushels	13,232,818	13,158,422	15,016,804
Corn, bushels	74,379,206	47,701,850	37,148,717
Oats, bushels	23,798,409	17,674,346	13,913,761
Barley, bushels	5,451,824	5,243,531	2,868,060
Rye, bushels	971,603	57,000	28,624
Total bushels	117,833,860	83,835,149	68,975,966
Flour, barrels	1,006,951	787,512	1,630,345
Total grain, including flour as wheat	122,868,615	87,772,709	77,127,691
	1896.	1895.	1894.
Flour, barrels	10,384,184	8,971,740	11,488,530
Wheat, bushels	54,411,207	47,256,005	50,194,130
Corn, bushels	47,811,010	37,579,311	29,078,520
Oats, bushels	40,107,499	22,231,271	15,560,230
Barley, bushels	16,697,744	10,958,229	8,625,090
Rye, bushels	4,404,354	871,612	501,195
Total grain, bushels	163,431,814	118,896,428	103,959,165
Flour to grain, bushels	51,920,920	44,858,700	57,442,650
Grand Total, bushels	215,352,734	163,755,128	161,401,815

Around the Lakes.

Pfohl Bros. have given up the idea of raising the Grand Traverse, which sank near Colchester, as she is broken in two.

Buffalo fuel docks are still holding to former prices and will not advance the rate above $2 unless the supply gets much shorter than at present.

The fire in the Union Dry Dock Company's planing mill did not damage the plant so that much time will be lost on repair or construction work.

The million-dollar drawbridge which connects Superior, Wis., and Duuth, Minn., was thrown open to the public July 13, with appropriate exercises.

Captain James Reid reports that he has raised the Cayuga 8 inches from her side towards an upright position, which is necessary to the placing of the pontoons for effective work.

Cleveland and Toledo naval reserves camped at Johnson's island this week. They had their own steamer Johnson, and Assistant Secretary of the Navy Roosevelt inspected the camp.

A prominent coal dealer says that the head of the lakes coal men are not desirous of sending any coal out of their own territory and will not unless the price is such that transactions under present circumstances would warrant. They would prefer to make a nominal profit on the sales to their own customers than to make a large profit for one sale to persons that might never buy of them again.

J. J. Hill has arranged to build a big dock on St. Louis bay. The contract has been let and work has actually begun. The new dock will be a big one and will employ a crew of men from now till snow flies.

Raymond & Co., owners of the independent elevator, Buffalo, will build a 150,000-bushel storehouse next to their elevator. This will make the company independent of the canalers. It will be completed in sixty days.

The report of the damage sustained by the Katahdin, which went on the bottom near Detour, some time ago, makes the amount $13,306. There will also be some other charges. This is considerably more than was expected.

Last week a board of engineer officers, Col. J. A. Smith, senior, met at Toledo and heard arguments in the case of the Lake Shore bridge at Toledo being an obstruction to navigation, and to determine what changes were necessary.

A shipment of pig iron to the Krupp gun works at Essen, Germany, was made from the Bay Viey furnaces. The barge D. P. Dobbins took the iron to Buffalo, where it was placed in canal boats for New York and transferred to an ocean steamer.

Capt. Minar says that there is only one thing that the North West needs, and that is a wheel forward to hold her back. On the up trip she ran from Two Harbors to Duluth, 26 miles, in an hour and thirteen minutes, which is a small fraction more than 21¼ miles an hour.

Grattan & Jennings, of Buffalo, has secured the contract for the building of a large dock at East 11th street in New York city. The cost of the dock will be $125,000, and the firm will have five months in which to complete the dock. The dock will be constructed of white pine on stone-filled timber cribs.

The steamer George T. Hope was fined $1,500 by Collector of Customs Zehrieng. She was reported by the Calumet, which is stationed at Chicago. She was fined $500 for having only one pilot, $500 for having an insufficient number of water pails and $500 for not having her name on her oars and ax handles.

There was a collision between the Goodrich Line steamer Virginia and the whaleback Christopher Columbus just as the two big boats were leaving Milwaukee. The force with which the steamers came together crushed one of the Virginia's life boats and tore six awning stanchions from the whaleback. By the barest margin no passengers were hurt, but there was a panic on each boat.

The Canadian supply steamer Lake Michigan went to Buffalo for a lot of soft coal for fuel. Some was taken in bulk for her own use and the rest was put into bags for the use of the various light-houses in Canadian waters. It shows that if the coal strike has cut the American fleet off from its full amount of fuel supply, the Canadians are still worse off in that direction.

Chicago river and harbor are soon to be inspected by General Wilson, chief of engineers, United States army. The exact date of the investigation has not yet been determined on, but it is expected that General Wilson will reach Chicago in a few days. His purpose is to become thoroughly acquainted with the conditions and requirements of the river as a navigable waterway.

The work of recovering the copper from the steamer Pewabic is not progressing as fast as the wreckers could wish for. Last week the amount taken up from the wreck was small. The copper is in immense masses and is imbedded in the clay bottom. Most of the grapples from the diving bell were broken in the effort to raise it. One mass weighing several tons, slipped just as it reached the top of the water, and taking a sheer as it dropped, missed the diving bell about a foot.

The International Longshoremen's union elected officers at their Cleveland convention as follows: President, Chas. Kelly, of Washburne, Wis.; first vice president, Frank Foster, Escanaba, Mich.; second vice president, M. P. Cannon, Ashland, Wis.; third vice president, Chris Goebels, Cleveland; secretary and treasurer, Harry C. Barter, Detroit. Daniel Keefe, of Chicago and Secretary Barter were appointed a committee to attend the next annual meeting of the Lake Carriers' Association in January to represent the union in fixing a scale of wages.

Water-Tube Boilers for Cargo Steamers.

The following paper read before the conference of the institution of civil engineers in England will answer many of the objections urged against water-tube boilers for cargo steamers.

The water tube boiler first appeared in America in the very early days of this century, long before Queen Victoria ascended the British throne. The object of Colonel Taylor, in 1807, was to substitute for the heavy, roomy, and somewhat inefficient Cornish boiler a generator more suitable to the exigencies of shipboard, and that after experience with the paddle-steamer Claremont on the Hudson. It will thus be seen that at the outset the distinguishing features of a water-tube boiler—viz., light weight and small space occupied—operated to cause it to be proposed in the mercantile marine of America. Many efforts have since been made in America to employ a water-tube boiler of some kind or other in mercantile ships, so that to-day the engineers of the United States are in a much more receptive mood for the adoption of the water-tube boiler than are the engineers of this country, where hitherto the attempts to use that form of boiler at sea have been few and far between, and mostly attended with ill-success.

In H. M. navy, experiments with both the Belleville and Thornycroft boilers have shown that the type can be worked as economically as to fuel as the Scotch boiler, and that the amount of coal required to get up steam is considerably less. There is indeed no prima facie reason why the water-tube boiler, properly designed and properly worked, should not be capable of evaporating as much water from a pound of fuel as the ordinary boiler can. The prime cost of the Belleville boiler is undoubtedly very much greater than that of the best cylindrical boilers, and it is probable that every kind of water tube boiler in which so much screwing and so much accuracy of fitting is involved, and for which so many special fittings are required, will always exceed the cost of the old type of boiler; but the Babcock and Wilcox boiler, and boilers of the type in which the tubes are simply expanded in place, and for which no special appliances are necessary either for circulation or for fuel burning, cost little or no more than the ordinary boiler. Experience with both the Belleville and the Babcock boiler has shown that defects and mishaps may be remedied at sea by the vessel's own staff, and that mishaps of a more serious nature can at comparatively slight expense and in a short time be effected in port.

With existing designs of water-tube boiler, a little more care in stoking is necessary, especially if the best results from the fuel are required; but there is nothing so serious as to prevent the ordinary every-day marine fireman from being educated in a few hours to manage the fires of a water-tube boiler as well as he manages those of the Scotch boiler. From the conditions of employment in the mercantile marine this is likely for some time to be a difficulty; still it is not an insuperable one, and, if ship's engineers will take the proper precautions, need not be one of long duration in any ship.

The shipping of the mercantile marine may be roughly divided into (1) passenger steamers pure and simple; (2) cargo steamers carrying passengers; and (3) cargo steamers pure and simple. The passenger steamer must necessarily be a fast one, and is usually of fourteen to twenty-two knots speed. Its speed is dependent on its form and the power its machinery can develop. Without the fine form the largest power is unavailing for speed, and without the necessary power the fine form is useless. Fineness of form means minimum of displacement, and consequent minimum weight of hull and machinery. Great power means great weight; therefore in this class of ship everything is resolved into a question of weight. The hull of the vessel has to be designed and constructed in accordance with the rules and regulations of registries and the Board of Trade, which circumscribe the designer. The engineer in designing the machinery is similarly fettered; but he can, by causing a small engine to work at a large number of revolutions, and by skillful design, considerably reduce the weight per I.H.P. The great item of weight, however, is the boiler and the water contained in it. Consequently, by changing from the heavy Scotch boiler, with its mass of water, to the lighter water-tube boiler, with its small quantity of water, much more horse-power can be developed in the ship, or her lines may be fined, or there may be modifications in both directions with perhaps the best results. Large numbers of passenger steamers are on short service, making daily or nightly runs of a few hours at a time, steam being raised on each occasion, and lowered when done with. The water-tube boiler accommodates itself admirably to this; and not only so, but seeing that steam can be raised in half an hour, the boiler-room staff of such a boat can have ample rest between the runs, besides requiring only a small consumption of fuel to raise steam, so that even if the boiler when running is not so economical as the Scotch boiler, the total result of a run of a few hours duration is a consumption of no more coal. It is also necessary in passenger steamers that the running should be uniform. The water-tube boiler, with its very high pressure and reducing valve, permits of this, as the variation of pressure in the engine room is exceedingly slight.

With the second class of steamers—namely, the cargo and passenger boat combined—speed is desirable, but it must not be on extravagant conditions. It is usually from twelve to fifteen knots; therefore any saving in weight by the adoption of a water-tube boiler would not be taken advantage of to increase the speed very largely by increasing the power, but it might, and probably would, lead to an increase in speed by the finding of the ends of the ship without loss of cargo-carrying power. If, however, the owners were quite content with the speed, they could effect a very considerabe gain in the increased cargo-carrying capacity obtained by the saving in weight of machinery, in some trades and in some ships the difference would often mean a useful margin of profit instead of a loss. In certain vessels of this class a saving in weight of boiler would permit of the carrying of a larger quantity of fuel, which might be bought at a cheap port, and enable the ship to return to a cheap port, instead of being obliged to purchase it at a dear one, as is often the case now, and this without disturbing the question of cargo-carrying, so frequently a nice point with ships of this class. In the cargo and passenger steamer in short trades, the same advantages in the raising and lowering of steam would be appreciated as in the passenger ship.

In the cargo-boat, pure and simple, the water tube boiler does not make such a good bid for acceptance as in the other two classes; but it has still something to offer, especially to those of moderate and small size—namely, the advantages stated above for the cargo-passenger steamer.

There are not lacking signs that the final adoption of the water-tube boiler in the mercantile marine will be preceded by the use of a mongrel form or combination of a water tube and a tank boiler, and in some respects such a boiler is more tempting to the mercantile engineer than the pure article. Such boilers would, of necessity, contain more water than the water tube boiler, pure and simple, and consequently would not evaporate dry in so quick a time in case of the feed failing temporarily—a fear often expressed by practical sea going men.

The Modern Marine Engine.

The first ship having triple expansion engines to enter the transatlantic trade was the Martello, built in 1884 for the Wilson Line by Earle's Shipbuilding Company of Hull. This ship was 370 feet long, of 43 feet beam and 28 feet deep. She had engines with cylinders 35, 50 and 82 inches in diameter and 57 inches stroke, carried 150 pounds working pressure, indicated 2,400 horse power and made 12 knots on a consumption of 38 tons of coal per day.

In 1886 the North German Lloyd Company placed in service the fine steamers Aller, Trave and Saale, built by the Fairfield Company, with engine cyindlers 44, 70 and 108 inches in diameter and 72 inches stroke, thus being the first of the large passenger lines to adopt engines of the triple expansion type.

The triple expansion engine being fairly established in popular favor, the commercial balance soon adjusted itself to the new conditions of greater economy of operation, and engine builders began to seek avenues for still further advancement which naturally took the direction of quadruple expansion. It was soon found, however, that further advance by means of expansion in consecutive cylinders offered much less promise than in the past, and that improvement was rather to be looked for in the use of various small economies, hitherto neglected as profitless or impracticable refinements.

The future of the quadruple expansion engine would seem to be largely dependent upon the perfecting of the water-tube boiler, as with the advent of a boiler of that type which will exhibit such a degree of economy, durability and facility of repair as to secure its general adoption, one of the chief causes now tending against the use of the quadruple expansion system, namely, the difficulty of obtaining boilers which can be economically built and successfully kept in continuous service under the required high-pressure and temperature will disappear.—Charls E. Hyde in the Marine Number of Cassier's Magazine.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, $1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30. 1891	204	111,856 45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
" " " 1896	117	108,782.38
Total	864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered	17,219,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation	232	231	234	365	365	365

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

In a communication from a lake captain in this issue of the Review attention is called to the fact that masters and mates in Chicago have an advantage over those in other lake ports of learning navigation, under the teaching of a government instructor. At first thought it seems reasonable that Cleveland which is accessible to a larger number of captains than Chicago should have the same advantages. But the navigation school conducted in Chicago by the assistant hydrographer, Mr. C. L. Wilson, is in no sense a government school, and Mr. Wilson gives his time, outside of the hours he is engaged in his office duties. The organization of the school was the result of his own personal effort, although the project was endorsed by the chief hydrographer. At the time the Chicago school was established the matter of having a similar school in Cleveland was brought up. Mr. Wilson was a graduate of the naval academy, and there not being any vacancy in the navy for him at the time, he was assigned to the hydrographic service. Therefore he is peculiarly fitted to teach, as the assistant at Cleveland would not be, although he is familiar with the subjects. If another Mr. Wilson was willing to be assigned to the Cleveland hydrographic office as assistant and was wiling to give his leisure time to teaching navigation, and the present head of the hydrographic office were willing, Cleveland might have a navigation school. Otherwise she could not. It would seem, however, that all this might be accomplished, if there is a general demand for it. Captains and mates who would take up the study if a Cleveland school was established might write the branch hydrographic office, Cleveland, about it.

The Quarrel in the Navy.

A brief telegraph dispatch published recently said that Secretary Long of the navy refused to accept the resignations of three cadets of the Annapolis Naval Academy. It also said that this was the first time in years the secretary had interposed his veto when junior officers desired to leave the service.

Thereby hangs an interesting tale, says an exchange. Those three cadets—George Weber of Arkansas, H. L. Collins of Pennsylvania and P. L. Pratt of Illinois—want to leave the service to go into private business; public business obviously is not profitable enough. That seems a strange condition of affairs. Ordinary men are glad to get into public service. They are like all the engineer cadets, either in the army or navy, the very flower of the graduating class. They are like cadets of that character for the past fifteen or twenty years—the desired men. Great establishments like the Carnegie and Bethlehem steel works want them in their service. Each of the three have offers of positions at salaries from $3,500 to $12,000 a year. They want to exchange the $1,800 a year positions the government will give them for the more lucrative ones to be had in private life. The government makes no distinction in pay between the brightest men graduated and the dullest.

The only difference is that the engineer cadets will visit Europe for a post-graduate course to study the actual conditions that exist in building ships on the Clyde or building Krupp guns in the establishment of the great iron master. They will also cruise during this post-graduate course of two years. Then they will receive commissions as assistant engineers, with the relative rank and pay of ensign—$1,800 a year.

The less bright cadets will not become expert engineers. They will cruise two years and become ensigns. They will be the executive officers on board the war vessels. What will the engineer cadet get if he stays in the navy? He will not even have a title that is recognized by the public as anything indicating high grade. First he will be an assistant engineer. That's a title suggestive of dirty and greasy overalls, and work in a stifling hot engine room, without gold lace or glory. Then he becomes a passed assistant engineer—suggestion of more work under same conditions. If old age does not cut him off he becomes a chief engineer—a full fledged engineer, whose "relative rank" may be anything from that of a lieutenant to captain.

These engineers are staff officers and the men who were dullers are line officers. Usually they are spoken of as line and staff; the line officers have precedence over the staff. And there is no peace between them because of this pernicious practice in precedence. Each vessel has its quota of line and staff officers. The lowest line officer in authority outranks the highest staff officer. Suppose the battleship Iowa were in a fight and all the line officers except the youngest ensign were killed. Suppose also the engineer officer had the relative rank of captain. The difference between an ensign and captain among line officers in the navy is equal to the difference between a colonel and the youngest second lieutenant in the army. Well, under such conditions, the youthful ensign would be in command. He would issue orders to the engineer, who might be his grandfather.

Wants a Navigation School in Cleveland

Editor Marine Review:—In your issue of July 1st I noticed an article about prizes for captains and mates, offered by Mr. Geo. L. McCurdy, the insurance man, to encourage attendance at the Chicago Navigation School. I would like to ask why not establish schools of navigation in other places besides Chicago. Under the present arrangement the Chicago men have an advantage. This is an age of progress and in order to keep up with the times we must keep up with all improvements. In order to do that it requires study. Those who apply themselves most studiously to that which will increase their proficiency will come to the front as successful men. I for one would like to learn all that is possible in this business and would avail myself of an opportunity to attend a school if there was one near where I lived. I have no doubt that there are others just as anxious to learn as myself. I hope this may be taken up and that something may result from it.

E. L. Sawyer, master barge Magna.

Fairport, O., July 17, 1897.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, July 17, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	3,635,000	7,750,000
Duluth	805,000	10,000
Milwaukee	109,000	3,000
Detroit	8,000	24,000
Toledo	195,000	301,000
Buffalo	595,000	363,000
	5,347,000	8,451,000

As compared with a week ago, the above figures show, at the several points named, an increase of 343,000 bushels of wheat and a decrease of 476,000 bushels of corn.

U. S. Torpedo Boat Porter.

The trial course of the torpedo boat Porter on the 11th inst. was from East Twenty-sixth street wharf, New York, up Long Island Sound, around Montauk Point and back on the seaward side of Long Iland, to Sandy Hook The official report, says the Army and Navy Journal, shows that she accomplished this distance of 232 miles in twelve hours and three-quarters. The first three-quarters of an hour she was run under one boiler at a speed of 15 knots. Then she utilized a second boiler, making 20 knots with 160 pounds of steam and one-quarter-inch of air pressure forced draught. Upon the opening of the main stops with one inch of air pressure and 150 pounds of steam she made 25 knots. Between Stratford shoal and Falkners, she used three boilers with 200 pounds of steam and one inch of air pressure and attained, during this portion of her run, her maximum speed for the trip, 26.1 knots. On the return trip a leak in the main feed pipe occurred on account of which all the fresh water was lost, and one boiler only could be utilized and that with salt water, in addition to the evaporators and distillers. The board, in commenting on the leaky flange, ascribes the accident to a defective design, and recommends an improvement therein. The board found the steering gear generally satisfactory, except that considerable lost motion was developed and much noise at times, due to the vibration of the attendant amidships rack, owing to defective design, or wear, which can be remedied by a modfication of the rack. Thumping of the starboard crank was noted, and higher temperature since the new design of strainer has been put on. At highest speed the trim of the craft was observed with a level and found to be 1.1° squat. Compared with the length of the vessel this is about three feet and four inches.

On the next day's trial off Sandy Hook a test of the torpedo tubes was made, one torpedo being fired from each tube. The torpedo on the port side forward ran 600 yards with a deflection to the right. The torpedo amidships ran 150 yards, and with a faint line of bubbles, sank. The tube aft did not run owing to the screws not being unlocked. The torpedo guns worked well except the amidships one whose releasing trimming apparently did not function. The tactical diameter, determined for a speed of 17 knots was found to be 1100 feet. In the test of reversing the engines from full speed ahead to full speed astern, estimated at a speed of 17 knots, a loss of way of 25 seconds was found, and the boat stopped at two-thirds of her length. The time necessary to shift the helm by steam, from hard a port to hard a starboard, and the reverse, while going at full speed was 6 seconds. The hand steering gear is pronounced most satisfactory. No bad effects developed from the use of salt water in the boilers. In concluding its report the board gives its opinion that a 12-hour trial is necessarily too severe, and recommends that in future the run of vessels of the class of the Porter be abridged.

In General.

During a trial in Narragansett Bay, the torpdeo boat Dupont, on July 7, made a speed of 30.83 knots with a boiler pressure of 225 lbs., the revolutions of her engines being 420 a minute.

The John P. Holland Torpedo Boat Co., of New York, on July 18, filed with the secretary of state at Albany, a certificate of an increase of its capital from $500,000 to $600,000 and an increase in the number of its directors from five to seven.

Secretary Long will accept the recommendations of the board of naval bureau chiefs as to the award of contracts for three torpedo boats. In this case the contracts will go to the Harland & Hollingsworth Co., Wilmington, Del., the Gas Engine & Power Co., New York, and Wolff & Zwicker, Seattle, Wash.

A Bangor paper describes the new schooner F. A. Palmer as a monster, and comments on her 3,000 ton cargo. Her principal dimensions are, keel, 274.5 feet; beam, 43.05; hold, 21; poop, running from taff-rail to 15 feet forward of main rigging, 3 feet, 10½ inches; gross tonnage, 2,052. The lakes has steel schooners a hundred feet longer that will carry almost twice as much cargo.

A conference has taken place in the English house of commons in regard to a dispute between certain ship building firms and the admiralty. By the construction of the Blenheim, Grafton and Theseus, the Thames Ship Building Company claims to have lost $575,000 and by the construction of the Endymion and St. George, Earl's Ship Building Company claims to have lost $450,000 net. The reasons given for the firm's losses are admiralty delays, inability to obtain plans, changes in construction, and failure of the heads of the construction department of the board to make up their minds exactly as to what they wanted.

The river passenger steamer City of Monroe badly damaged by the St. Louis cyclone, was rebuilt at the Barmore marine railways, Madison, Ind. She was lengthened to 320 feet long, is 45 feet beam and 8 feet hold and has capacity for 2,200 tons freight. She is lighted with 300 electric lights and electric fans were put in the ladies' cabins. The St. Louis & New Orleans Anchor line owns the new boat and her name has been changed to Hill City.

The ship building genius of Europe and the United States is just now deeply absorbed in the proposition made by the French government, which offers a series of very handsome prizes to those who shall devise really effectual submarine vessels. The recent experiments with the Holland boat have stirred the governments of foreign nations, and the French offer is believed to be the first of a series of such suggestions that will emanate from the various governments of Europe.

The Holland boat has been run on the surface satisfactorily several times, but Commander Kimball's visit was made the occasion of the second step in the experiments. The party entered the boat, the sinking tanks were opened and the water was let in. The Holland gradually sank out of sight. She went down and rested on the bottom. After a short stay the compressed air was released from the tanks and the water which had sunk the boat, was blown out through the Kingston valves. The Holland came up promptly, and those who were inside said that the mechanism worked admirably, and that the test was satisfactory in every respect.

What Does This Mean?

A perusal of the history of railway transactions during the past four years shows us that this period has been the most disastrous, from a financial standpoint, of any other of the present decade. Under the circumstances it would almost seem as though the further development or improvement of railway facilities must cease. Yet, strange to say, many notable instances prove that the contrary is true. In numerous instances, first class roads, despite the hard times, and general business depression, have made very decided advances, not only in the improvement of the material condition of the roadway itself, but likewise the equipment and service. And the public has been a great gainer by the public spiritedness of the roads.

One of the most notable cases of railway development is the Nickel Plate road, which seems to have forged right ahead with its improvements and has exhibited an unrelenting determination to give the public the best possible facilities, in spite of the hard times. And how well this corporation has succeeded in its laudable efforts, the excellent condition of its system bears ample evidence. Yet the secret of this success is obvious: The people have responded very generously to a generous effort to give them the worth of their money. That is all. The people's money has enabled the road to better its facilities in every respect; thus the work has been of a mutual and reciprocal character. The liberal patronage accorded the road has brought a handsome return to the people in the shape of improved facilities for travel, yet at the same time at lower rates.

And now, it seems, the Nickel Plate road is still engaged in further efforts to serve the people well. It has a high class roadway to begin with; a most excellent equipment to end with, and a safe, fast, and reliable service for the delectation of its patrons. And in all, it offers a most attractive menu to travelers bound east or west in the shape of "A Peerless Trio of Fast Express Trains."—George A. Benham, special correspondent.

It will be Commodore William Cumming hereafter, and not captain. Of course the captain at the head of the fleet is called commodore sometimes, but Commander Wilde U. S. N., secretary of the Light-house board sent recently for presentation to the captain of the Coralia a regulation commodore's pennant, with the fleet sign of a globe worked in white in one corner. It was presented as the result of an acquaintance that sprang up between them during the recent trip of Com. Wilde up the lakes, with Commander Lamberton of the second district. One of the Menominee steamers was several hours ahead of the Coralia going up Lake Superior, and she got her cargo of ore and was bound down before the Coralia got in. The commander would not believe that it was the same boat until he saw the ore docks. If government officials would familiarize themselves with the lakes there would be no difficulty in securing appropriations.

The Naval Review at Spithead.

The Prince of Wales, representing her majesty, reviewed a fine fleet of foreign war ships, representing all the maritime nations of the world, proudest, strongest and swiftest of these craft being the United States armored cruiser Brooklyn, flying the flag of Rear Admiral Miller, and the heir apparent also inspected about 30 miles of British warships, in which were 165 fighting ships of different classes, carrying about 900 heavy guns, manned by over 38,000 men and of about 550,000 tons in all, with 597,180 horse power.

Each maritime nation sent an admiral in his flagship to witness the review. They formed a line abreast of the British battleships, where they were favorably placed to compare their own naval architecture with that of other nations. Each nation sent its best available ship and a magnificent display resulted.

An interesting feature of the British fleet was the training ships, which comprised three of the early ironclads, a squadron of cruisers which usually winters, with a training crew on board, in the West Indies or in some other warm latitude, and a fleet of training brigs which cruise in the neighborhood of the British ports.

The British fleet assembled June 22 and was drawn up in four lines, extending from abreast of Portsmouth harbor to a distance of about five miles to the westward.

Following the precedent of former naval reviews, there was free access to the review ground up to the hour named for the official inspection, when all vessels with visitors anchored in their assigned positions, and the tour of the fleet was commenced by the Prince of Wales.

As usual on such occasions, the Trinity yacht Irene, with the elder brethren on board, led the way, the Victoria and Albert, with the Prince of Wales on board, being accompanied by the royal yachts Osborne and Alberta, the admiralty yacht Enchantress, the Cunaad liner Campania with the members of the house of lords and house of commons on board, and a vessel conveying the foreign ambassadors and their suites.

The battleships Jupiter, Victorious and Renown made their first appearance in the commissioned fleet.

These four ships, as well as the Majestic and Magnificent, are armed with the new 12-inch wire guns, of which each ship carries four mounted en barbette, two forward and two aft. These guns have a range of about 15 miles. In addition they carry twelve 6-inch quick-firers, eighteen 12 pdr. quick-firers, and twelve 3 pdr. Hotchkiss, and are fitted with five torpedo discharge tubes.

Another important addition to the fleet was seen in the two cruisers Powerful and Terrible, the former commissioned for the China station, vessels of 25,000 horse power and a speed of 22 knots. They include in their armament two 9.2-inch guns and a number of quick-firers and Maxims.

All the warships were illuminated in the evening with "rainbows" of electric lights extending from the stem to the bow, over the mastheads. In addition, the hulls of all the vessels present were outlined by electric light. The effect of simultaneously lighting up every ship of the gigantic fleet, and swiching off was magical.

Petroleum for Tugs.

The successful working on the Delaware of the steam tug White Rose, built not long since on the North River for harbor towing, leads to the belief among those engaged in that line of work that the time is not far distant when petroleum will be used to generate steam to drive all such craft.

It has not been generally known outside of tugboat circles that this tug's steam is all generated through the burning of petroleum, and, while thus far the cost has been a trifle in excess of what her coal bills would have been, this is said to be experience in the use of oil as fuel has not yet been attained.

It has long been the idea of the Standard Oil Company to perfect this idea to such an extent as to render possible the use of oil as fuel on all their ocean tankers. Just what a saving this would be is well known to those familiar with the shipping trade. In the single item of time that would be saved, aside from all other advantages, this undertaking, if carried out successfully, would mean the saving of large sums of money. Experiments on larger vessels will shortly be made.

The Hydrographic office announces the publication of a new chart, No. 1582, of Lake St. Clair and St. Clair and Detroit rivers, made on a scale of .6 inch to the mile. This chart is made more complete by the addition (on the same sheet) of five plans of special localities, made on a scale of 1½ inches to the mile. These plans include St. Clair Flats, Port Huron, approaches to Marine City, Fromefield to St. Clair, and Detroit river between the city of Detroit and Lake St. Clair. The chart and plans have scales in both nautical and statute miles. This chart may be obtained from the Marine Review, Cleveland, Ohio.

U. S. ENGINEER OFFICE, Duluth, Minn., July 10, 1897.—Sealed proposals for building two breakwater piers, each some 2700 feet long, at Lake Superior entrance to Portage Lake Ship Canals, Mich., will be received here until noon, Sept. 10, 1897, and then publicly opened. Information furnished on application. CLINTON B. SEARS, Major Engrs. Sept. 3.

The Bessemer Steamship Company

Solicits Catalogues, Prices and Discounts from manufacturers and wholesale dealers in Ship Machinery, Brass Goods, Rope, Paints, Asbestos, Packing, Hose, Furniture, Piping, Glass and Crockery, Tinware, Ranges, Carpeting, Bedding, Life-preservers, Rafts and Boats, Engineers' Supplies and Tools, Carpenters' Tools, Electric Supplies, Lamps, Grate Bars, Castings, etc., etc., etc.

ALSO QUOTATIONS from Market men and Grocers on the Lakes for Provisions and Meat, best quality only.

CATALOGUES without quotations are not wanted.

ALL GOODS except provisions to be delivered in Cleveland.

Address L. M. BOWERS, General Manager,
CLEVELAND, OHIO.

FOR SALE.

Marine Engine Patterns. Modern type with working drawings. 3x5 simple, 5x7 simple, 8-18x12 compound, 10-20x12 compound, 4½-7-11x8 triple expansion, 6-10-16x10 triple expansion, 10-16-25x15 triple expansion. Can be had at a bargain. Would like an offer for them.

C. C. WORMER MACHINERY CO.,
55-59 Woodbridge St., W, Detroit, Mich.

WANTED

To lease, purchase or secure, a passenger boat to make an excursion run for whole season. Must be a good boat, well fitted for that purpose, not over 200 feet keel and must not draw more than seven feet water loaded, and five feet would be better. Should be able to develop speed of twelve miles per hour. Address MARINE REVIEW, Cleveland, O.

Chas. E. & W. F. Peck,

58 William St.
NEW YORK CITY.

812 Royal Insurance Building.
CHICAGO, ILL.

C. T. BOWRING & CO.,
5 & 6 Billiter Ave., E. C.
LONDON, ENG.

INSURANCE.

BROWN & CO.,
202 Main St.,
Buffalo, N. Y.

J. G. KEITH & CO.,
138 Rialto Bldg.,
Chicago, Ill.

LA SALLE & CO.,
Board of Trade Bldg.,
Duluth, Minn.

Are prepared to make rates on all classes of Marine Insurance on the great lakes, both CARGOES and HULLS.

"GREAT LAKES REGISTER."

F. D. HERRIMAN, Surveyor-General, Chicago, Ill.

Newport News Shipbuilding & Dry Dock COMPANY.

WORKS AT NEWPORT NEWS, VA.
(On Hampton Roads.)

Equipped with a Simpson's Basin Dry Dock capable of docking a vessel 600 feet long, drawing 25 feet of water, at any stage of the tide. Repairs made promptly and at reasonable rates.

SHIP AND ENGINE BUILDERS.

For estimates and further particulars, address

C. B. ORCUTT, Pres't,
No. 1 Broadway, New York.

WANTED

Party to furnish material for a steel hull from 55 to 60 feet long by 12 feet beam, and go in partnership with party who owns a suitable engine for same.

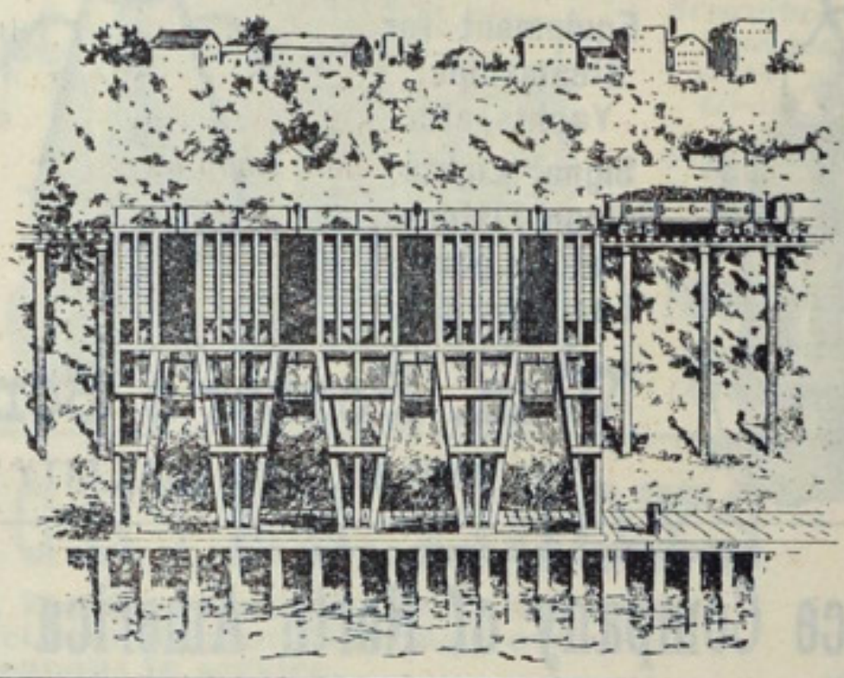
GEO. WOLF,
132 West River St., City.

ADVERTISING RATES ON APPLICATION.
COPY OF BOOK AND NAME IN DIRECTORY $5.
BLUE BOOK OF AMERICAN SHIPPING
409 PERRY-PAYNE BLDG. CLEVELAND, O. U.S.A.
CONTAINING PARTICULARS OF ALL THE PRINCIPAL COAST AND LAKE STEAM AND SAIL VESSELS
FOR CIRCULARIZING—★ LIST OF 1000 NAMES AND ADDRESSES, COVERING THE PRINCIPAL SHIP OWNERS AND BUILDERS OF THE UNITED STATES
3000 NAMES OF CAPTAINS
4000 NAMES OF ENGINEERS
ON FILE IN THE PRINCIPAL MARINE ORGANIZATION HEADQUARTERS OF THE WORLD.
HANDSOMELY ILLUSTRATED.
A DIRECTORY OF SHIP AND ENGINE BUILDERS AND THE MARINE BUSINESS OF THE UNITED STATES.
USED BY SHIP BUILDERS AND OWNERS FOR GETTING PRICES ON MATERIAL AND SUPPLIES
THE ONLY BOOK OF THE KIND PUBLISHED IN THE U.S.
BLUE BOOK

PUBLISHED JULY 15.
Now ready for delivery to Purchasers.

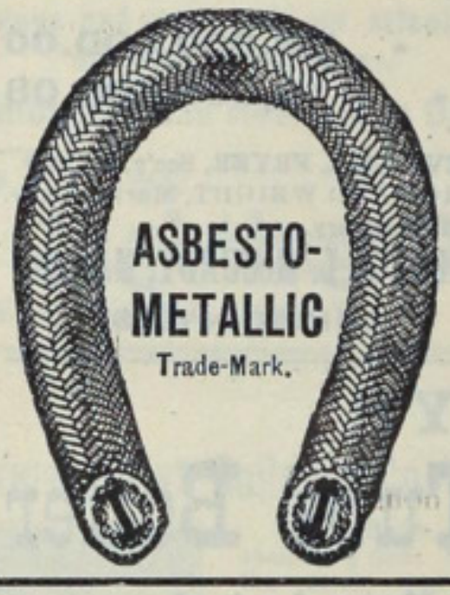
FUEL DOCKS OF OSBORNE, SAEGER & CO.

Cuyahoga River, just above Superior St. Viaduct, Cleveland, O



Best Youghiogheny Steam Coal Furnished Day or Night. No delay as Elevated Pockets are used.

Telephone 1106.



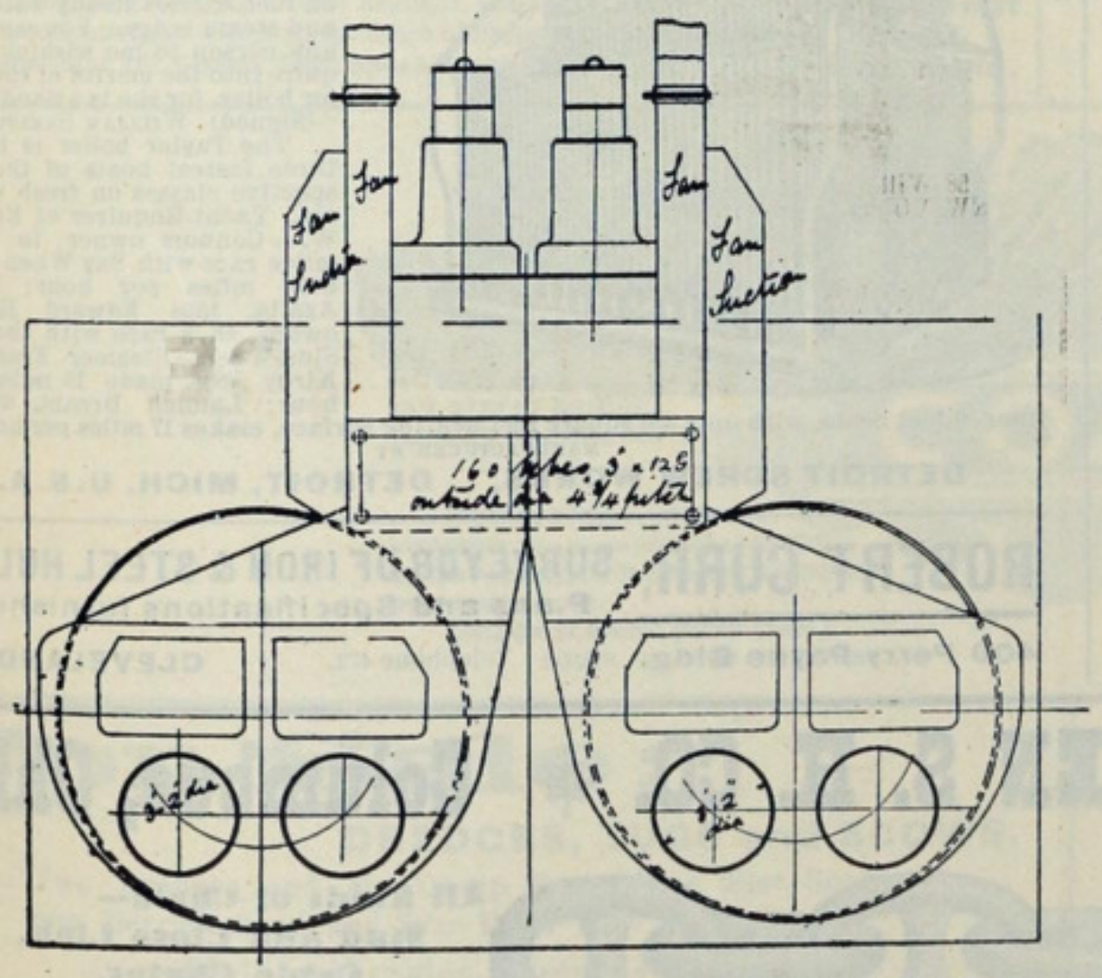
Lucky is the Engineer Who Uses

ASBESTO-METALLIC PACKING

It is in use on more lake steamers than any other, because it meets the requirements.

AMERICAN STEAM PACKING CO.,
Original Manufacturers of
PISTON PACKINGS,
60 Federal St., BOSTON, MASS.

The Ellis & Eaves Induced Draft---Serve Ribbed Tubes



DRAWING SHOWING PLAN FOR ADDING THE ELLIS & EAVES DRAFT TO LAKE STEAMERS.

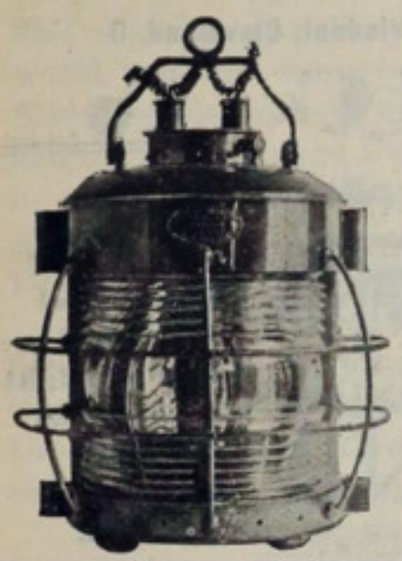
THIS SYSTEM OF DRAFT, WITH THE SERVE TUBES, SAVES MONEY.

S A V E S	25 Per Cent. of Your Fuel Bills.
A $ $ $ A	40 to 50 Per Cent. Boiler Capacity.
V $ $ $ V	The Life of the Boiler by Drawing Gases through Tubes.
E $ $ $ E	Firemen and Incidentally their Wages.
S A V E S	Cargo Space by Using a Smaller Number of Boilers.

For PARTICULARS and PRICES of applying to Steamers already Built and to Steamers Building, apply to

THE GLOBE IRON WORKS COMPANY, CLEVELAND, OHIO.

MARINE LAMPS



Oil and Electric Equipment for Steamships, Yachts, etc.

Signal Lights, Saloon Fixtures, Cabin Lamps, Lanterns, etc.

Wm. Porter's Sons,

271 Pearl St., NEW YORK CITY.

INCORPORATED 1794.

Insurance Company of North America

CAPITAL, Paid up in Cash, - - $3,000,000.00
ASSETS, . - - - - - - - - 9,686,808.08

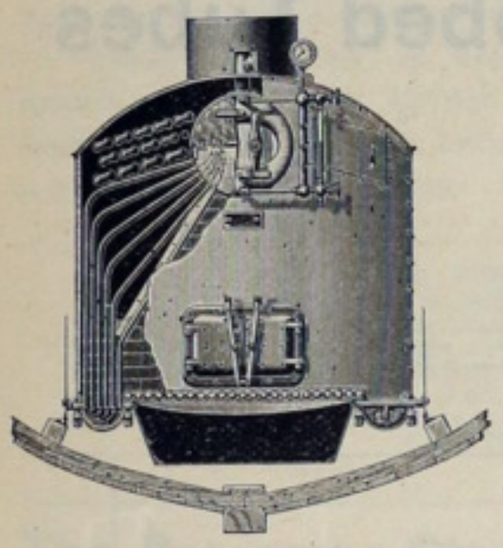
CHARLES PLATT, President. GREVILLE E. FRYER, Sec'y. & Treas.
EUGENE L. ELLISON, Vice-President. T. HOWARD WRIGHT, Marine Sec'y.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department. GEORGE L. McCURDY, Manager

CHICAGO, ILLS.

SEABURY'S
Safety Water Tube Boiler

For all types of Steam Vessels and Stationary Plants.



Reliable, Safe, Durable, Compact, Light Weight, Economical, Easily Managed.

Tubes may be readily cleaned, internally or externally.

Marine Engines,

STEAM and SAIL YACHTS,
THE ONLY NAPHTHA LAUNCH.

Gas Engine & Power Co. and Charles L. Seabury & Co. Consolidated.

MORRIS HEIGHTS, NEW YORK CITY.

G. H. FOSTER, Prest. MARK H. HANLON, V.-Prest. & Secy. W. H. WARNER, Treas.
DAVID BARNHISEL, Gen'l Mgr.

The Inter-Ocean Coal & Coke Co.

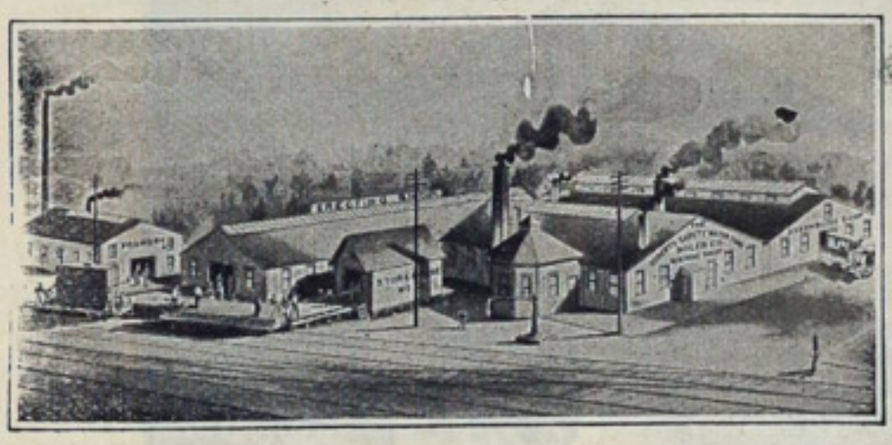
General office, 513 Perry-Payne Bldg., Cleveland.

PRODUCERS AND SHIPPERS.

Choicest Grades of YIOUGHIOGHENY COAL
FOR STEAMBOAT FUEL.

Lighter in Cleveland Harbor of 400 tons capacity.

CLEVELAND DOCKS, just north of Main Street bridge.
SAULT RIVER DOCK at Sault Ste Marie, ¼ mile below the locks.



Office of AMERICAN STEEL BARGE CO.

West Superior Wis., Oct. 31, 1895.

The Roberts Safety Water-Tube Boiler Co., 39 and 41 Cortlandt St., New York.

Gentlemen: Replying to yours of the 28th I am glad to say that the boiler you furnished us for tug "ISLAY" is giving entire satisfaction. I have heard no complaint about it whatever, but have heard a good deal in its favor. I ride on the boat frequently and must say that I am much pleased with its work. Very Truly yours, Alexander McDougall, General Manager.

THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest.

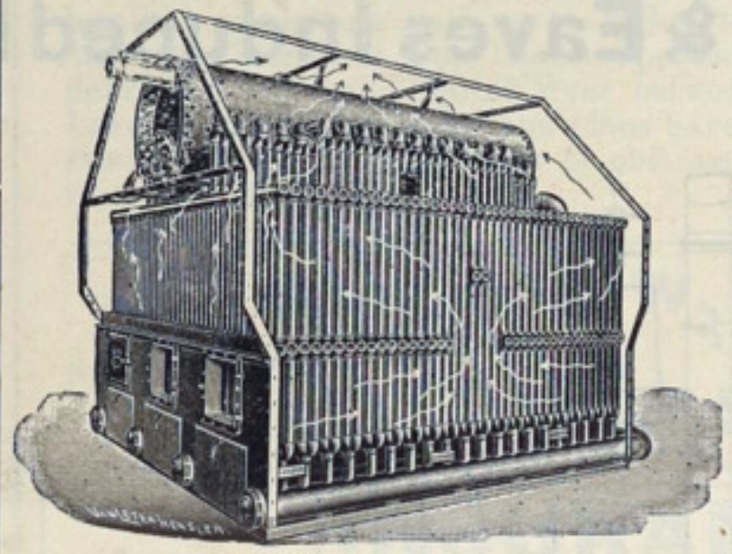
Adapted for use in Yachts, Launches, and Vessels of all Kinds.

Handsome Illustrated Circular sent free on application to

The Roberts Safety Water Tube Boiler Co.,

WORKS, RED BANK, N. J. 39 & 41 Cortlandt St., NEW YORK.

TAYLOR PATENT UPRIGHT WATER TUBE BOILER.



Chief Engineer Skelton of Steam Yacht Enquirer writes: "I can honestly say, that the Taylor boiler is the best boiler I ever handled, and I have been in the business 18 years. It is light on fuel, carries steady water line and steam is dry. You can refer any person to me wishing to inquire into the merits of the Taylor boilor, for she is a dandy."
(Signed) WILLIAM SKELTON, Jr.

The Taylor boiler is in the three fastest boats of their respective classes on fresh water, viz., Yacht Enquirer of Buffalo. W. J. Connors owner; in a 29½ miles race with Say When made 18.78 miles per hour; Yacht Azalia, late Edward Henkel owner, in a race with the fast Side-Wheel Steamer Frank E. Kirby, 1896, made 18 miles per hour; Launch Dream, 63 feet long, 9 feet beam, with only 350 square feet heating surface, makes 17 miles per hour.

MANUFACTURED BY
DETROIT SCREW WORKS, DETROIT, MICH. U.S.A.

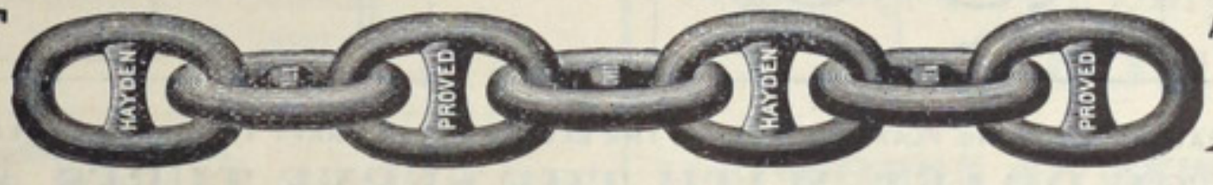
ROBERT CURR, SURVEYOR OF IRON & STEEL HULLS,

Plans and Specifications furnished.

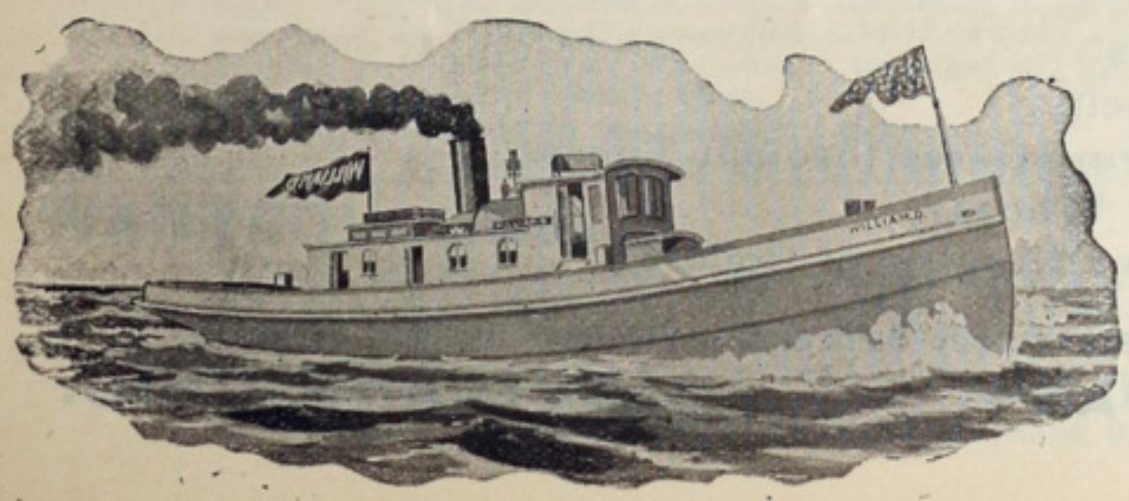
409 Perry-Payne Bldg. Telephone 472. CLEVELAND, O.

Chain Department ✻ P. HAYDEN S. H. CO. ✻ Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:
The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—Stud and Close Link, Cable Chains.
—Write for Prices.



C. E. GROVER, Prest.
D. R. HANNA, V. Prest.

W. A. COLLIER, Sec. & Treas.
CAPT. PHILIP SHIED, Marine Supt

The Ashtabula Tug Co.

Incorporated.
W. A. COLLIER, Gen. Mgr.

MAIN ST. BRIDGE, CLEVELAND, O.

CLEVELAND, Tel. 409. ASHTABULA, Tel. 149.

CHICAGO.

BARRY BROS.

Independent Tug Line.

TUGS

Rita McDonald, Crawford, C. M. Charnley, D. P. Hall, Ira O. Smith.
Wm. Dickinson, W. H. Wolf, Welcome, Commodore, Jack Barry.

Office, 240 South Water Street,

Telephone Main 273.

3 long whistles call our tugs.

DULUTH.

BARRY

Towing & Wrecking Co.

TUGS.

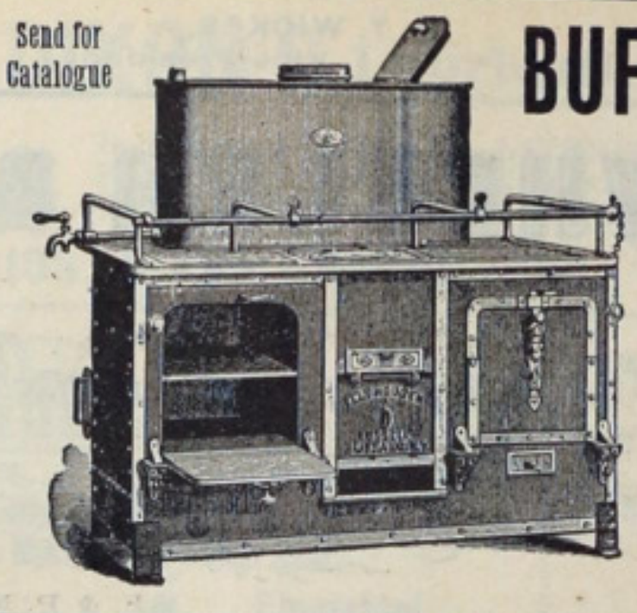
G. A. Tomlinson.
Industry,
Violet H. Raber,
Prodigy.

Office, foot of 5th Ave., West.

Telephone 544.

3 long whistles call our tugs.

Send for Catalogue



BUFFALO WROUGHT STEEL RANGES

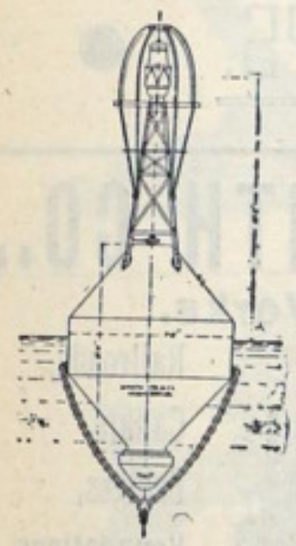
Steamboat and Vessel Ranges and Boilers, with patent Rotary Grate.

SOMETHING NEW AND GOOD.
We also carry the STAMFORD TUG AND YACHT GALLEY STOVES.

RUSSELL & WATSON

Successors to Felthousen & Russell.

145 Main St., BUFFALO, N. Y.



PINTSCH GAS LIGHTED BUOYS

Adopted by the English, German, French, Russian, Italian, and United States Light House Departments, for Channel and Harbor Lighting; over 500 gas buoys and gas beacons in service.

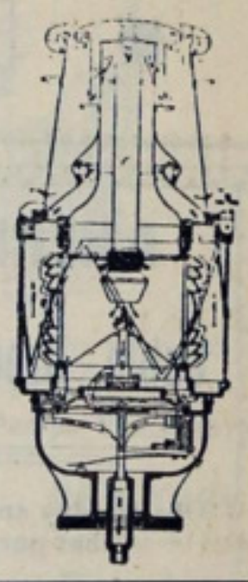
BURN CONTINUOUSLY from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and Steady Illumination. Economical and Reliable in Operation.

CONTROLLED BY THE

Safety Car Heating & Lighting Company,

160 BROADWAY, NEW YORK CITY.



WILLIAM WILFORD'S MATCHLESS WATERPROOF CLOTH Trade Mark.

WM. WILFORD'S

Matchless Water-Proof Canvas.

The best in the market for Hatch Covers, is stronger lighter and more durable than any Water-Proof Goods yet produced. It is made of a twisted thread of pure flax which renders it very strong. It will not crack like Cotton Goods or take fire as easily, which is a great advantage, if soft coal is used.

EDWARD A. BUNKER,

Room 617, 27 & 29 WILLIAM ST., NEW YORK.

JOHN HAUG, Consulting Engineer and Naval Architect.

Ship and Engineer Surveyor Lloyds Register, London.
Plans, Specifications and Superintendence of Ships and their Machinery.
specialties—Bulk Oil Vessels High Speed Yacht Engines, etc.

206 Walnut Place, Philadelphia.

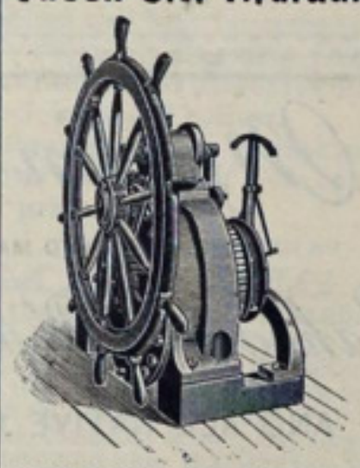
American Boat Building Co. Incorporated.

35x7 foot Launch Frame.

Knock-Down Boats, something new. We do the work, you nail together. Freight low, prices reasonable. Also completed Boats, Half-Raters, Knock-Abouts and Canoes. Send stamp for catalogue.

3517-21 S. Second Street, ST. LOUIS, MO.

Queen City Hydraulic Steerer.



Best and Most Powerful Steerer

FOR TUGS, STEAMERS, ETC.

Price—From $650 to $750, according to size and location in steamer.

Manufactured by

QUEEN CITY ENGINEERING CO., Buffalo, N.Y.

C. S. Richardson Fueling Co.

FUELING DOCKS:
NORTH PIER,
18TH STREET BRIDGE,
ILLINOIS CENTRAL SLIP "C."

COAL

STORAGE DOCKS FOR ANTHRACITE:
KINGSBURY ST. BETWEEN INDIANA & ERIE STS.
ELSTON AVE. DIVISION ST. BRIDGE, (NORTH BRANCH)
NORTH AVE. BRIDGE.
DIVISION ST. BRIDGE, (OGDEN CANAL)
SOUTH HALSTED ST. BRIDGE.

OFFICE, 225 DEARBORN ST.

CHICAGO.

For Sale:

DREDGES, TUGS and SCOWS.

Two Dredges and six Dump Scows, one Flat Scow, one Derrick Scow and four Tugs—

One with 15 by 17 engine, allowed 110 lbs. steam.
" " 17 by 16 " " 110 " "
" " 20 by 22 " " 125 " "
" " 20 by 24 " " 110 " "

Inquiries from parties who mean business cheerfully answered.

JAMES ROONEY, 1118 Collingwood Av., Toledo, O.

J. H. PARSONS CHEMICAL CO. TRADE A·B·C MARK CHICAGO, ILL.

ALKALI WATER PURIFIER!

A Pure Chemical for the safe Removal and Prevention of Scale in Steam Boilers. In use by many of the larger steamship lines on the great Lakes. Guaranteed.

MANUFACTURED BY

THE J. H. PARSONS CHEMICAL CO.,

1509 Masonic Temple, CHICAGO, ILL.

P. M. CHURCH & CO.,

SAVINGS BANK BLOCK, SAULT STE. MARIE, MICH

LEADING DEALERS IN

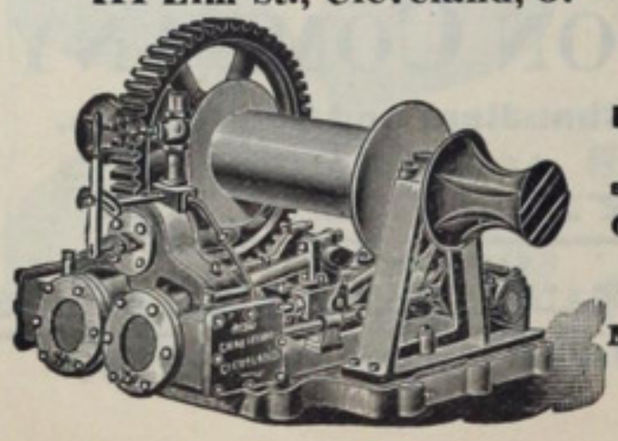
Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc.

FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

The Chase Machine Co.

111 Elm St., Cleveland, O.



MACHINISTS and ENGINEERS

MANUFACTURERS OF

Land and Marine Engines and Steam Pumps,

SOLE OWNERS AND MANUFCTURERS OF

Chase Fog Whistle Machine.

Over 150 in use on the best class of Lake Steamers.

Special Attention given to

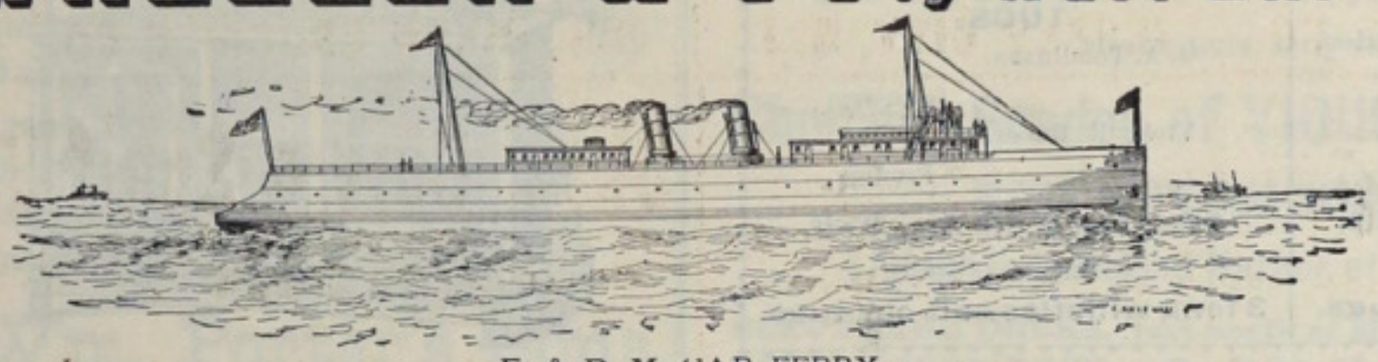
MARINE REPAIR WORK.

Engineers' Supplies.
Asbestos Pipe and Boiler Covering.

TELEPHONE 994.

F. W. WHEELER, President. H. T. WICKES, Vice-President. C. W. STIVER, Secretary. JNO. S. PORTER, Treasurer.

F. W. WHEELER & CO., West Bay City, Mich.



F. & P. M. CAR FERRY.

Builders of all kinds of METAL AND WOODEN SHIPS.

AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

CHAINS.

Our Dredge and Crane Chains are made of Iron Rolled Specially for that purpose in three qualities, "Burden's," "H. B. & S." iron, and "Burden's Best Best" iron.

THE J. B. CARR COMPANY, TROY, NEW YORK.

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

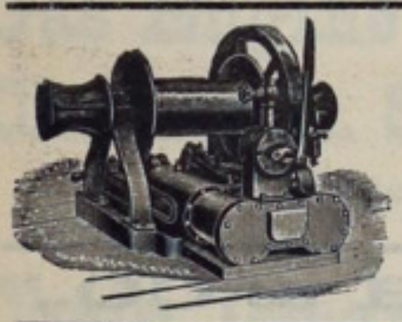
AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER ON SHORT NOTICE.

654 Seneca Street, Cleveland, Ohio.



DOCK and DECK HOISTS

ALL KINDS OF

Machinery & Friction Hoists.

SEND FOR PRICES AND CIRCULARS.

JACKSON & CHURCH, SAGINAW, MICH.

HOWARD H. BAKER & CO.

Ship Chandlers and Sail Makers,

18 to 26 Terrace. BUFFALO, N.Y.

H. CHANNON COMPANY

Ship Chandlers and Sail Makers.

AGENTS FOR

RYLANDS BROS.

MANUFACTURERS OF

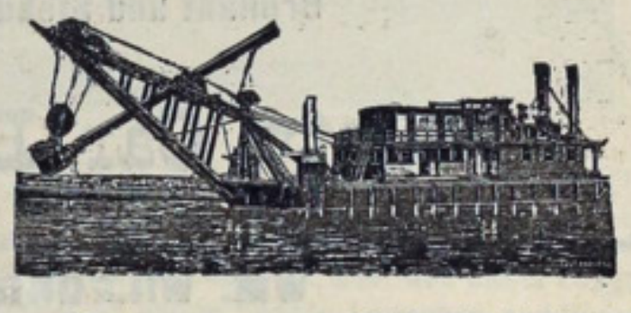
ENGLISH GALVANIZED STEEL HAWSERS.

24-26 Market Street, CHICAGO, ILL

THE L. P. & J. A. SMITH CO.,

Contractors of Public Works.

Dredging, Pile-Driving, Breakwaters, Dry Docks and Pier Building,



Railroads, Canals, Bridges, Foundations, Etc., etc.

23 River St., CLEVELAND, O.

H. E. STEVENS. TOM MEAD. LEW PRESLEY

BUCKEYE STEAM FITTING CO.

Steam Fitters, Engineers Supplies,

Phone 4058. AGENTS FOR

RAINBOW PACKING.

Open Day and Night. 117 River St., CLEVELAND, O.

THOS. DREIN & SON, TATNALL AND RAILROAD STS., WILMINGTON, DEL.

Builders of Metallic Life Boats and Rafts, Yachts and Pleasure Boats, Life Preservers. Outfit for Lake Steamers a Specialty.

Yacht, Boat and Canoe Hardware, Boats, Oars and Cordage,

L. W. FERDINAND & CO., 176-184 Federal St., Boston, Mass.

FOR SALE.

Steam Yacht in first-class Condition.

Capacity 5 tons. Dimensions are 40 feet long, 8 feet beam and 3 feet draft. Inquire of

BENHAM & KARR, 165 River St., Cleveland, O.

SUITABLE FOR DELIVERY PURPOSES.

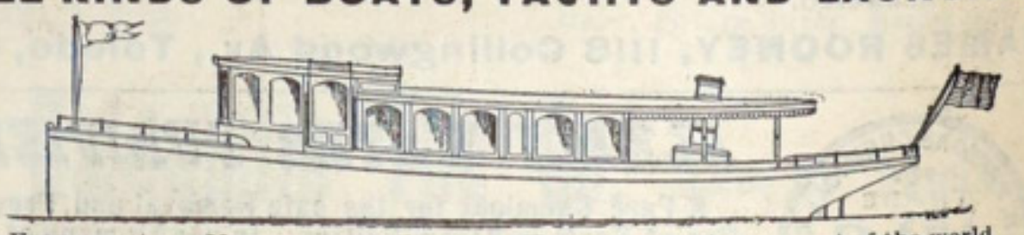
Paint your Vessels with **Superior Graphite Paint.**

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments. Strictly anti-rust, and most durable and economical.

DETROIT GRAPHITE MFG. CO., 541 River St., Detroit, Mich.

ALL KINDS OF BOATS, YACHTS AND LAUNCHES



Frames set up, MARKED AND SHIPPED KNOCKDOWN to any part of the world.

Send 50 cents for "ALBUM OF DESIGNS"; 72 Pages, 43 Subjects, 66 Designs.

Address Station A. FRED W. MARTIN, Yacht Designer, NORTH CHICAGO ILL. (Formerly of Racine, Wis.)

DIXON'S Graphite Pipe Joint Compound

Enables you to MAKE A TIGHTER JOINT than you can possibly make with red lead. You can do it easier, and parts can be separated at any time without breaking anything. Send for sample and circular.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

DIXON'S Lubricating Graphite

Is fully explained in an INTERESTING AND INSTRUCTIVE PAMPHLET which is FREE to all interested. It will pay all Engineers and Machinists to SEND FOR IT.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

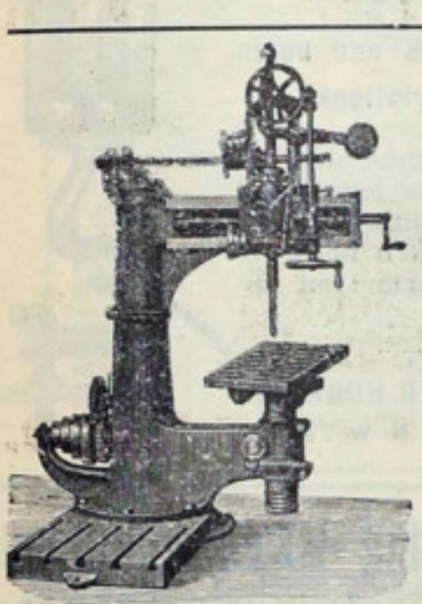
Fred'k Baldt, President. W. M. Gelston, Vice-President
W. S. Bickley, Sec'y and Treas.

Baldt Patent Stockless Anchor.

Made of the finest quality of open-hearth steel and constructed on the ball and socket principle.

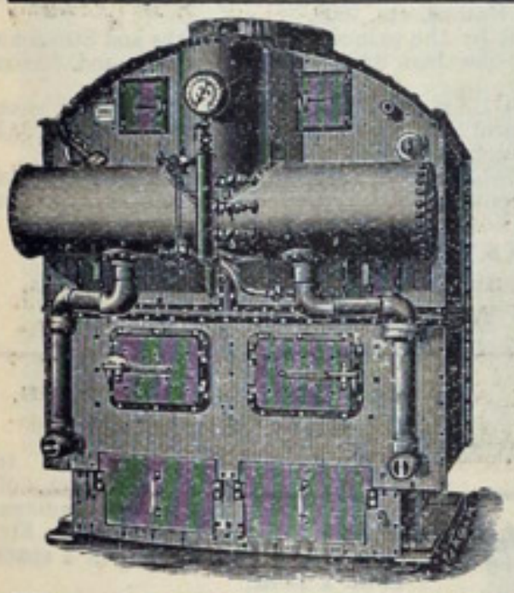
Many points of superiority over ordinary Stockless Anchors.

BALDT ANCHOR COMPANY,
CHESTER, PA.
WALTER MILLER, Western Reserve Bldg., Cleveland, Ohio,
Representative for the Great Lakes.
☞ New catalogue containing valuable tables sent on application.



Bement, Miles & Company,

PHILADELPHIA, PA.
MANUFACTURERS OF
Metal Working Machine Tools
For Ship Yards, Railroad Shops, Locomotive and Car Builders, Machine Shops, Rolling Mills, Steam Forges, Boiler Shops, Bridge Works, etc., etc.
Steam Hammers, Steam and Hydraulic Riveting Machines.
New York Office: Taylor Bldg. No. 39 Cortlandt St.
Chicago Office: 1534 Marquette Building.



ALMY'S PATENT
SECTIONAL
Water-Tube-Boilers.

NOW USED IN
18 Passenger Boats from 70 to 160 feet long.
27 Steam Yachts from 50 to 160 feet long.
U. S. Torpedo Boat "Stiletto."
Numerous Small Launches and Stationary Boilers are giving most excellent results.

ALMY WATER-TUBE BOILER CO.,
No. 178-184 Allens Avenue, near Rhodes St.
PROVIDENCE, R. I.

VANDUZEN Steam JET PUMPS

THE BEST IN THE WORLD.
Pumps any kind of Liquid. Always in order. Never clogs nor freezes. Fully Guaranteed. COST $7 AND UPWARD. Especially useful for Mines, Quarries, Pits, Wells, Clay Pits, Breweries, on Steamships, Ferryboats, Sugar Plantations, etc. A full stock always on hand.
Descriptive Catalogue and Prices furnished Free. **THE E. W. VAN DUZEN CO.,**
Cincinnati, O.

For Stationary, Portable, Traction Engines, Tugboats, &c.
Thoroughly Reliable—Perfectly Automatic.
JENKINS BROS., - Selling Agents,
NEW YORK, BOSTON, PHILA., CHICAGO.

SIMPLE, STRONG and RELIABLE.

Changed from Steam to Hand by one Lever in Less Than One Second

No. 8
BECK
Patent Steam and Hand
STEERING GEAR.

BUILT BY
Pawling & Harnischfeger,
MILWAUKEE, WIS.

Chas. Corv & Son

Manufacturers of the
Mechanical and Electric Marine Telegraph,

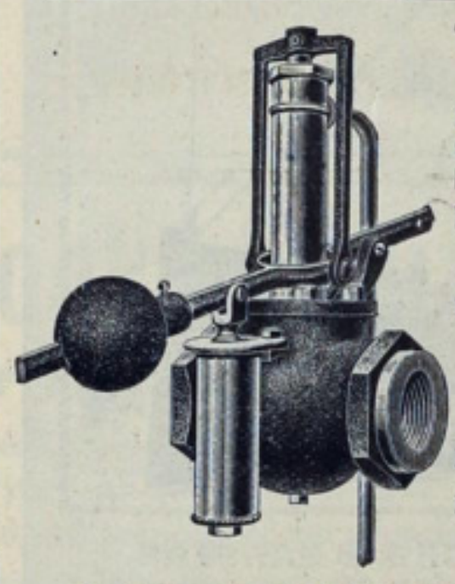
Electrical Helm Indicators
Electric Call Bells.
Engine Bells and Brass Work of all descriptions, Shrieking and Siren Whistles.

278 DIVISION ST., NEW YORK CITY.

Alfred B. Sands & Son
YACHT PLUMBERS,
AND MANUFACTURERS OF
YACHT PLUMBING SPECIALTIES.

Patent applied for.

The only pump water closet in the world so constructed as to be positively free from danger of flooding.
Folding Lavatories, Pumps Ventilators, Etc., Etc.
134 Beekman St., NEW YORK.



The "DAVIS" Pressure Regulator and Reducing Valve.

Is the simplest and best for reducing the pressure to Steam Steering Engines, Donkey Engines, Steam Winches and all places requiring a uniform pressure below that of boilers.
No diaphragms, spring or packing.
Cut shows ball weight. We can furnish scale weights if preferred.

MANUFACTURED BY
G. M. DAVIS & CO.
106 N. Clinton St., CHICAGO, ILL.
FOR SALE BY
R. E. Hills, Chicago. C. H. McCutcheon, Buffalo
Geo. Worthington Co., Cleveland.
P. M. Church, Sault Ste. Marie. Jas. Walker & Son, Detroit
Jas. Clements & Son, Bay City, Mich
Cleveland Ship Building Co., Cleveland.
Chicago Ship Building Co., Chicago.

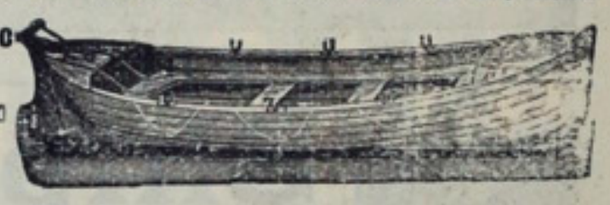
Selling agents—The McIntosh-Huntington Co., Cleveland, O.; The Detroit Sheet Metal and Brass Works, Detroit, Mich.

NEVERSINK CORK JACKET AND LIFE BELT.

Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors
Consolidated Cork Life Preservers. Superior to all others. **Ring Buoys and Fenders.**

SAFEST, CHEAPEST. Approved and adopted by U. S. Board of Supervising Inspectors.
Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Vessels and the trade supplied. Send for catalogue.
Awarded four Medals by World's Columbian Exposition

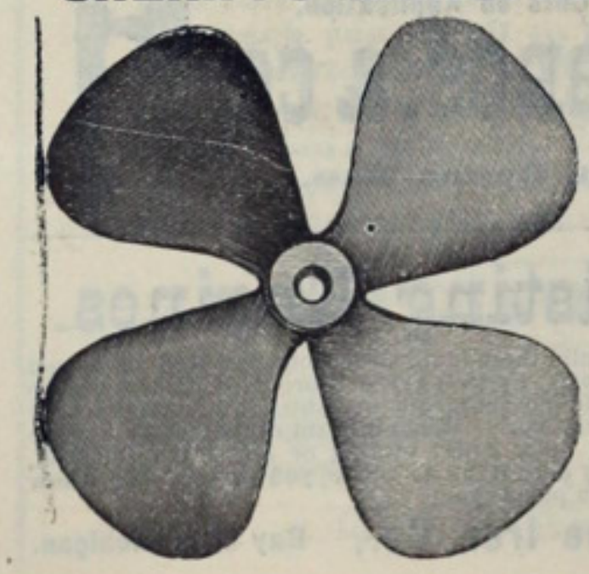
Metallic and Wooden Life Boats.



Metallic Life Rafts, Marine Drags.
Manufacturer of Woolsey's Patent Life Buoy, which is the lightest, cheapest and most compact Life Raft known.

Send for Illustrated Catalogue.
Get our prices before buying elsewhere.
D. KAHNWEILER,
437 Pearl Street, NEW YORK CITY.

SHERIFFS MANUFACTURING COMPANY,



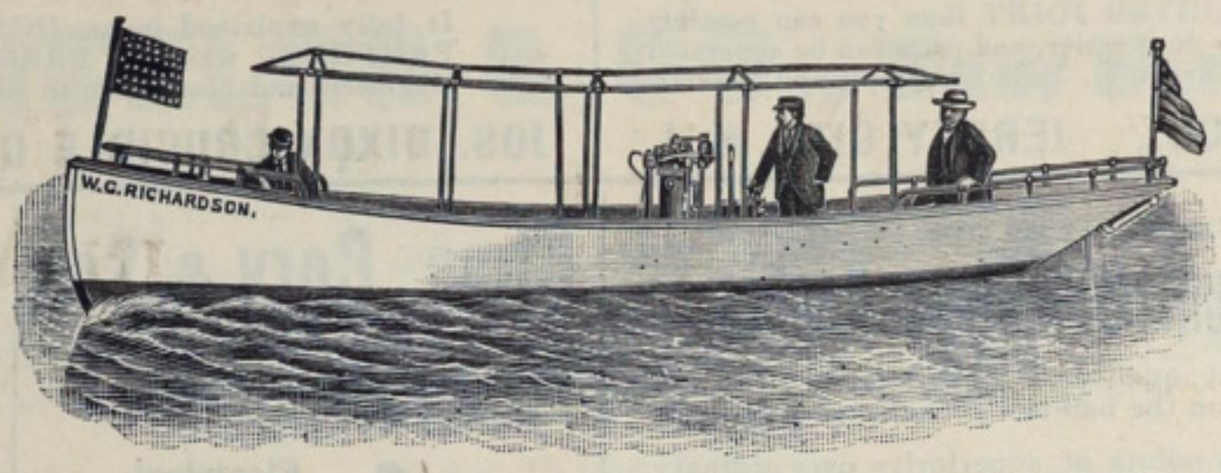
Manufacturers of
Propeller Wheels.
MARINE ENGINES AND REPAIRS.
Milwaukee, Wis.
TELEPHONE S.—163.

The Wootters Gas Engine.

Especially adapted for launches and ferry boats. Fitted with friction clutch or reversible shaft.

These engines are giving entire satisfaction in the pleasure yacht W. C. Richardson and the delivery launch Lotta.

Prices and particulars furnished on application.

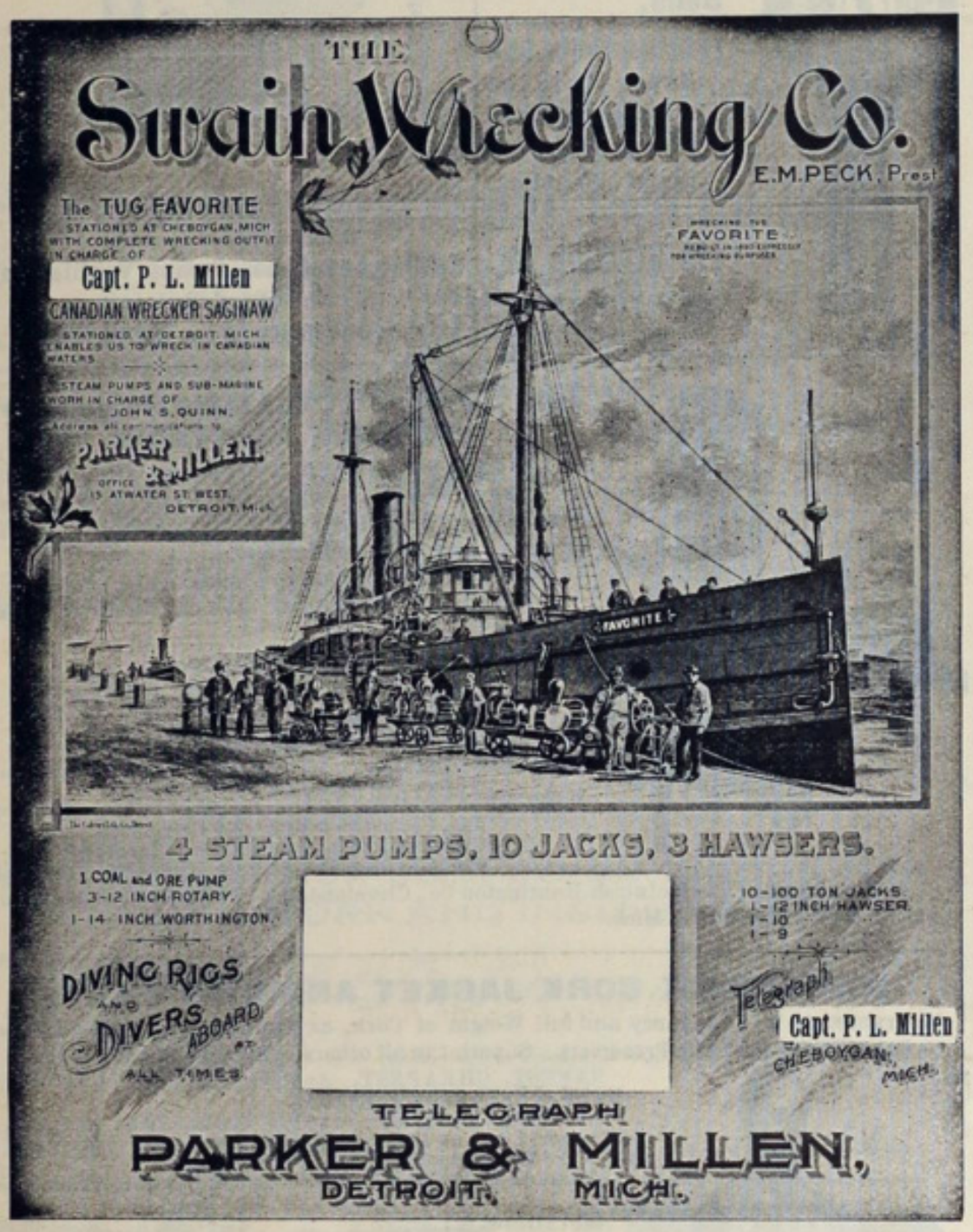


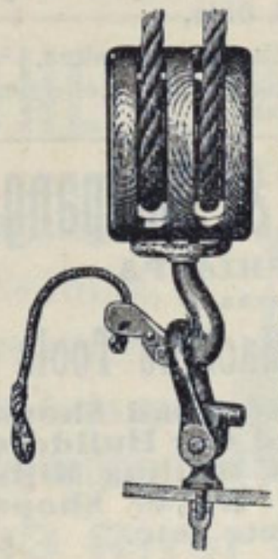
NAPHTHA LAUNCH W. C. RICHARDSON, (Engine 8 horse power—speed 8 miles an hour.)

Suitable for all purposes requiring from 1 to 200 horse-power, with the lowest possible expenditure.

Engines of the stationary type built for every purpose where a reliable and efficient power is required.

BUILT BY THE . . . . . **McMYLER MFG. CO., GAS ENGINE DEPARTMENT, 180 Columbus St., CLEVELAND, O.**





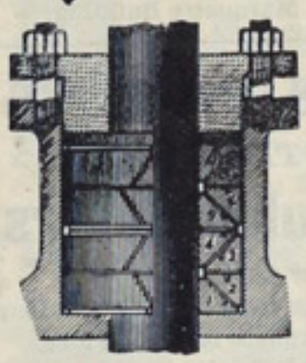
STANDARD AUTOMATIC RELEASING HOOK

For NAPTHA LAUNCHES and boats of all sizes and descriptions.

Will release a boat immediately in the roughest sea or under speed and can be hooked on without delay or injury to the hands of men hooking it on. For further information apply to

STAND'T AUT RELEAS'G HOOK CO.,
22 and 24 State Street, N w York.

KATZENSTEIN'S Self-Acting METAL PACKING,



For PISTON RODS, VALVE STEMS, etc., of every description, for Steam Engines, Pumps, etc., etc.

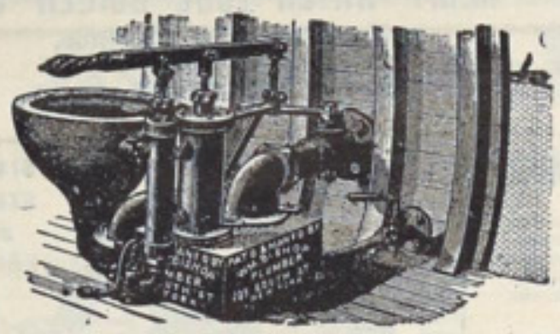
Adopted and in use by the principal Iron Works and Steamship Companies, within the last twelve years, in this and foreign countries.

FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints.

DOUBLE-ACTING BALANCED WATER-TIGHT BULKHEAD DOORS for Steamers. Also Agents for the McColl-Cumming PATENT LIQUID RUDDER BRAKE. For full particulars and reference, address:

L. KATZENSTEIN & CO.,
General Machinists, Brass Finishers, Engineers' Supplies,
357 West St., New York.

Patent Pump Water Closet.



For Yachts, Pilot Boats, Naval Ships, Etc.

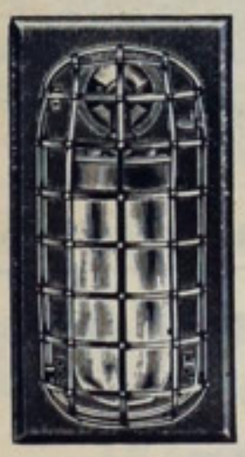
For above or below water line. In use on U.S. Cruiser New York, Columbia, and Battleships Indiana, Maine, Texas, Massachusetts, Etc. Our No. 4 can be put in a space 14 in. x 15 in.

WILLIAM BISHOP & SON,
205 South St., NEW YORK.
724 Third Av., BROOKLYN.
Telephone 569 Franklin.
Yacht Fittings a Specialty.

MIERS CORYELL
21 E. 21st Street, NEW YORK.

Consulting Mechanical Engineer,

Plans, Specifications and Superintendence. Marine and Water Works Engines and Boilers.



Ship Lamps

OIL AND ELECTRIC FIXTURERS
— FOR —
Steamships, Yachts, &c.
GREAT VARIETY OF DESIGNS.
Prices and Cuts on Application.

PAGE BROS. & CO.

347 to 357 Cambridge St. Boston, Mass.

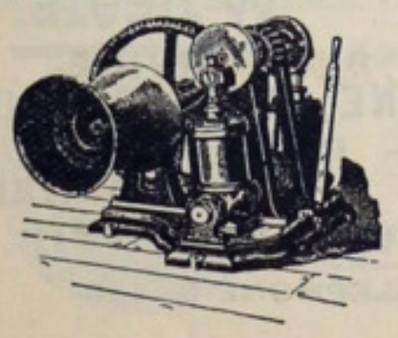
Engineers and others

directly or indirectly interested in power or Steam Heating Plants, should send for our **1897 CATALOGUE**, mailed free. Contains full description of Jenkins Bros. Valves, Jenkins '96 Packing, Sellers Restarting Injectors and other high-grade Steam Specialties.

JENKINS BROTHERS,

NEW YORK: 71 John St. PHILADELPHIA: 117 N. 4th St. BOSTON: 17 Pearl St. CHICAGO: 31-33 N. Canal St

---



Hoisting Engines.

We build them in all sizes from new and improved designs. Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a Hoist for marine work, dock work, mining or any other purpose, kindly permit us to name you prices. We know we can please you.

Marine Iron Co., Bay City, Michigan.

C. H. McCUTCHEON.

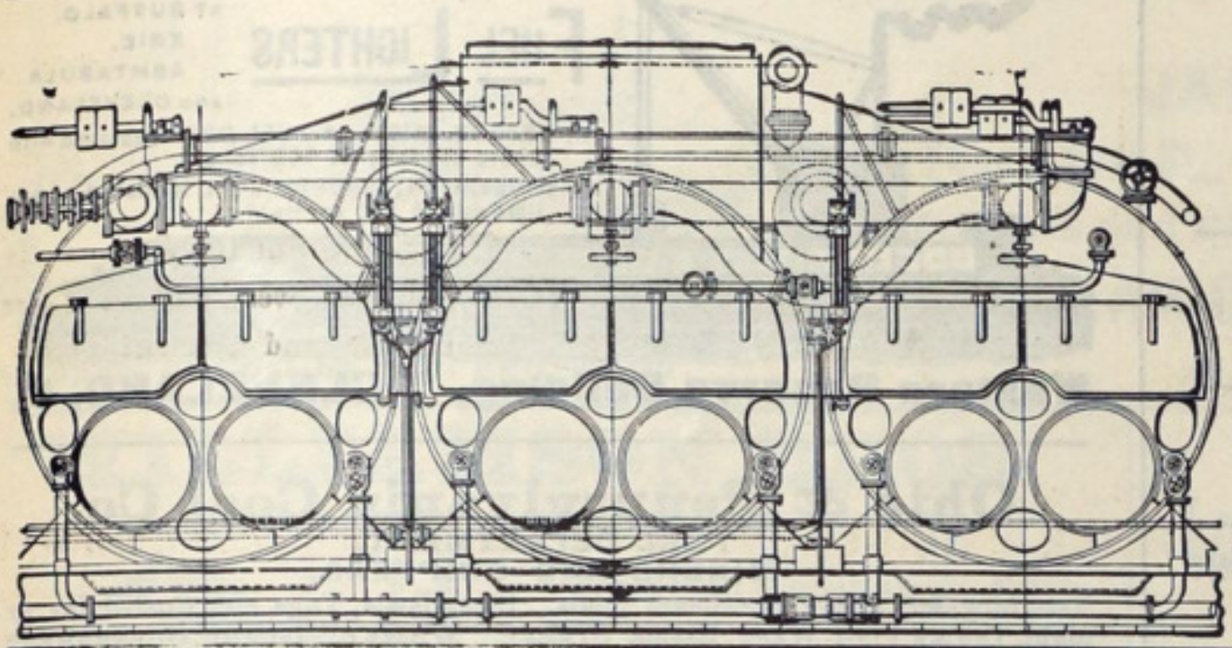
(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 68. **No. 18 Ohio Street, BUFFALO, N. Y.**

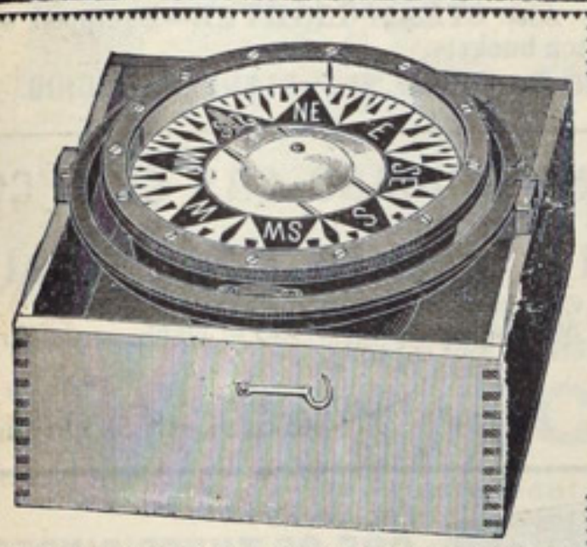
LAKE ERIE BOILER WORKS, BUFFALO, N. Y.



THE BEST EQUIPPED PLANT IN AMERICA

FOR THE MANUFACTURE OF

MODERN MARINE BOILERS.



Liquid (Spirit) Compasses

of our make, in seven sizes, embody every known point of excellence possessed by those of other makers, and in addition have been improved in many important details.

We therefore positively assert that, in general construction and thoroughly scientific action of the card, we offer the best Liquid Compass ever made in this or any country. For sale by Ship Chandlers generally.

John Bliss & Co., 128 Front Street, New York.

ADVERTISING RATES ON APPLICATION.
COPY OF BOOK AND NAME IN DIRECTORY $5.
BLUE BOOK OF AMERICAN SHIPPING
409 PERRY-PAYNE BLDG.
CLEVELAND, O. U.S.A.
CONTAINING PARTICULARS OF ALL THE PRINCIPAL COAST AND LAKE STEAM AND SAIL VESSELS
FOR CIRCULARIZING ★ LIST OF 1000 NAMES AND ADDRESSES, COVERING THE PRINCIPAL SHIP OWNERS AND BUILDERS OF THE UNITED STATES
3000 NAMES OF CAPTAINS
4000 NAMES OF ENGINEERS
ON FILE IN THE PRINCIPAL MARINE ORGANIZATION HEADQUARTERS OF THE WORLD.
HANDSOMELY ILLUSTRATED
A DIRECTORY OF SHIP AND ENGINE BUILDERS AND THE MARINE BUSINESS OF THE UNITED STATES.
USED BY SHIP BUILDERS AND OWNERS FOR GETTING PRICES ON MATERIAL AND SUPPLIES
THE ONLY BOOK OF THE KIND PUBLISHED IN THE U.S.

1897 Blue Book of American Shipping.

"IT IS BETTER TO BOAST AFTER THE BATTLE."

The publishers of the Blue Book are using their energy to make the 1897 Blue Book more valuable than the 1896 Blue Book. Last year we promised to get out a book that would be satisfactory. The result exceeded all expectation and was pronounced far superior to any lake directory ever published.

The value of a directory consists in the frequency to which it is referred to. The Blue Book is used three times to one, more than any other—because it is reliable.

If you want to advertise in or subscribe for the best marine directory ever published, write, at once,

BLUE BOOK OF AMERICAN SHIPPING, 409 Perry-Payne Bldg., CLEVELAND, O.

"The most perfect feed water heater and purifier we ever saw."—R. HAMMOND.

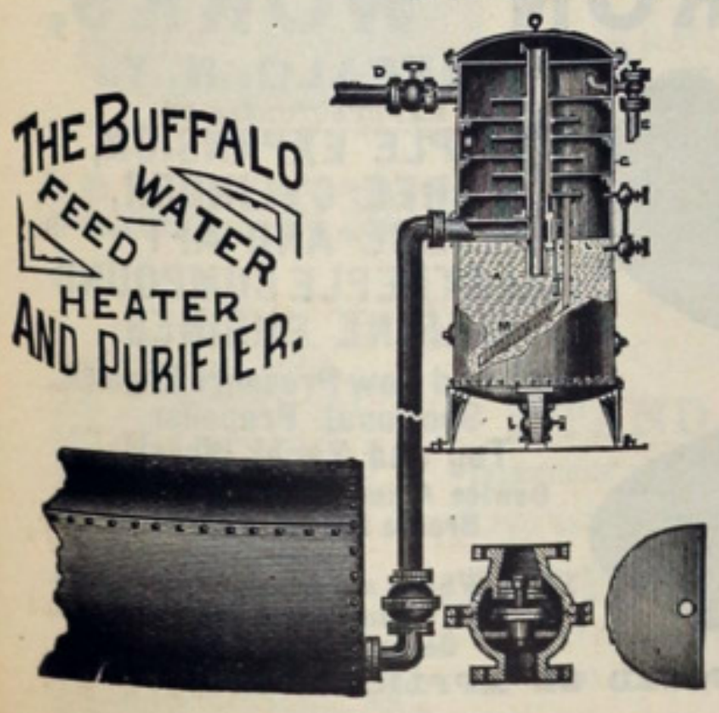
IN PRACTICAL USE ON 25 LAKE STEAMERS.

Every Purifier Warranted to Remove all Sediment or Scale-Forming Substance.

ROBERT LEARMONTH PATENTEE,

200 LAFAYETTE AVENUE, - - - - BUFFALO, N. Y.

SEND FOR CIRCULAR.



Names of Steamers on the Lakes using the

Buffalo Feed Water Heater and Purifier.

RED STAR LINE.—Str. Robert Mills, Str. Wyoming.

BAY CITY, MICH.—Str. H. C. Sibley, Str. B. Boutelle.

ANCHOR LINE.—Str. Mahoning, Str. Schuylkill, Str. Codortis, Str. Susquehanna, Str. Clarion, Str. Lehigh, Str. India, Str. China, Str. Japan, Str. Lycoming, Str. Conemaugh, Str. Juniata, Str. Alaska, Str. Delaware, Str. Conestoga, Str. Wissahickon, Str. Philadelphia, Str. Winslow.

LAKE MICHIGAN AND LAKE SUPERIOR TRANSPORTATION CO.—Str. Manitou.

Nickel Plate Ahoy? Aye, Aye Sir!
The line to hail and the line to take
To reach your craft to fit her out,
Is the well-known ship-shape Nickel Plate Route,
Chicago, Cleveland, Buffalo,
Or any port you want to go,
The shortest time and the lowest rate
Are shipmates with the Nickel Plate.

A SUPERB DINING CAR SERVICE.

For particulars inquire of

A. W. JOHNSTON, Genl. Supt.

or, B. F. HORNER, Genl. Pass. Agt.

Cleveland, O.

STEAM ENGINEERING

(Stationary, Locomotive, Marine); Mechanical Drawing; Architectural Drawing; Machine Design; Electricity; Architecture; Plumbing; Railroad, Municipal, **31 COURSES** Hydraulic & Bridge Engineering; Surveying and Mapping; Metal Pattern Cutting; Bookkeeping; Shorthand; English Branches; Mining; Metal Prospect'g.

TAUGHT BY MAIL — THOROUGH — PRACTICAL

All who study **GUARANTEED SUCCESS.**

Fees Moderate, Advance or Installments.

Circular Free: State subject you wish to study.

International Correspondence Schools, Box 965 Scranton, Pa.

HARVEY D. GOULDER,
LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

ALBERT J. GILCHRIST, PROCTOR IN ADMIRALTY,
No. 604 PERRY-PAYNE BLDG., CLEVELAND, OHIO.

AMBROSE V. POWELL, C.E., * * Consulting Engineer.
Specialties: Designing and Construction of DRY DOCKS, Harbor Works, Docks and Plants for Handling Coal and Ore.
Office, 507 Chamber of Commerce, - CHICAGO, ILL.

C. E. KREMER, *Attorney and Counselor-at-Law and Proctor in Admiralty.*
Rooms 14, 15 and 16, Bryan Block. 164 LA SALLE ST., CHICAGO, ILL.

HARVEY L. BROWN,
Counselor at Law and Proctor in Admiralty,
35 White Building, BUFFALO, N. Y.

HAWGOOD & MOORE W. A. HAWGOOD. J. W. MOORE.
Vessel and Insurance Agents,
Residence Phone, Doan 446—W. A. Hawgood.
Long Distance Tel. 2395. **608 Perry-Payne Bldg., CLEVELAND, O.**

W. C. RICHARDSON,
VESSEL AND MARINE INSURANCE AGENT.
Office Telephone 338.
Residence Telephone 2938. Nos. 606 & 607 Perry-Payne Bldg., Cleveland, O.

J. H. BARTOW, TELEPHONE 717.
Vessel and Insurance Agent,
611 and 612 Perry-Payne Bldg., Cleveland, O.

ALEX. CLARK. J. B. HALL. J. H. KILLERAN, *Marine Surveyor.*
A. Clark & Co. VESSEL AND INSURANCE AGENTS,
Tel. No. 892. 55 Main St., BUFFALO, N.Y.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.
MITCHELL & CO.,
Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO
Office Telephone, 737. Residence, John Mitchell, 3506.

C. R. JONES & CO., VESSEL AGENTS,
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

THOS. WILSON,
MANAGING OWNER
WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

J. T. ROSE. FRANK B. LAZIER.
ROSE & LAZIER,
Vessel Agents and Brokers, and Marine Insurance,
16 Board of Trade,
DULUTH, - - MINN.

PATENTS

QUICKLY SECURED. Trade-marks and Copyrights registered and patent business of every description promptly and skillfully conducted at lowest rates. Inventions introduced, companies formed, and PATENTS SOLD ON COMMISSION. 25 years' experience. Highest references. Send us model, sketch or Photo. of invention, with explanation, and we will report whether patentable or not, free of charge. OUR FEE PAYABLE WHEN PATENT IS ALLOWED. When patent is secured we will conduct its sale for you without extra charge. 32-PAGE HAND-BOOK and list of 200 inventions wanted mailed to inventors free upon request. This is the most complete little patent book published and every inventor should WRITE FOR ONE.
H. B. WILLSON & CO., Patent Solicitors, Le Droit B'l'd'g. WASHINGTON, D. C.

PALMER & CO.,
VESSEL AGENTS
AND UNDERWRITERS,
713 Perry-Payne Bldg., Cleveland, Ohio.
Telephone 644.

J. J. H. Brown. Edward Smith. J. B. Rodgers.
BROWN & CO.,
Vessel and Insurance Agents,
202 Main St.,
BUFFALO, N. Y.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,
—AND—
Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND, - OHIO.

ORESTES C. PINNEY,
Lawyer and Proctor in Admiralty.
Rooms 722 and 723 Perry-Payne Bldg
CLEVELAND, OHIO.
Telephone 2585.

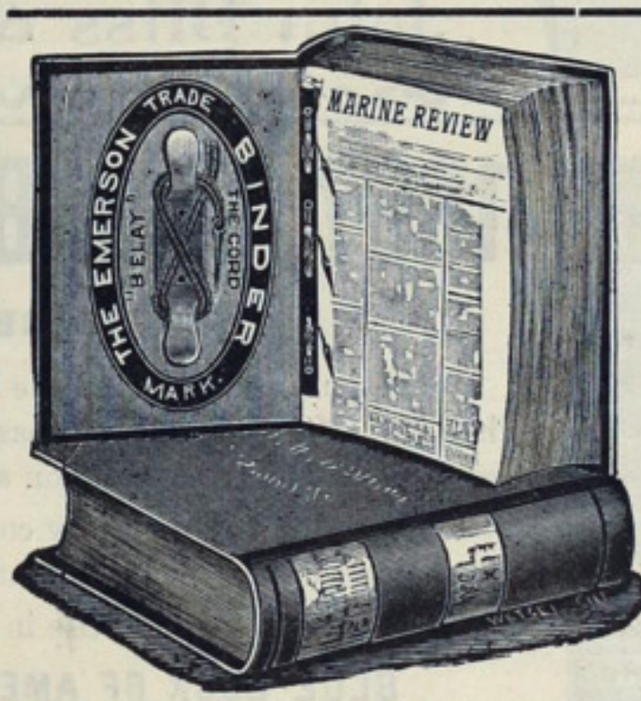
C. W. ELPHICKE. JAS. A. MYERS. CALVIN CARR.
C. W. ELPHICKE & CO.
GENERAL INSURANCE AGENTS,
Room 10, No. 6 Sherman St., Chicago, Ill.

Pickands, Mather & Co.,

FUEL LIGHTERS AT BUFFALO, ERIE, ASHTABULA AND CLEVELAND.
AT DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any time during Day or Night.
Western Reserve Building, CLEVELAND, O.

Ohio & Pennsylvania Coal Co.
FUEL DEPARTMENT.
MINERS AND SHIPPERS,
Youghiogheny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with Revolving Derrick and (100) two ton buckets.
Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.

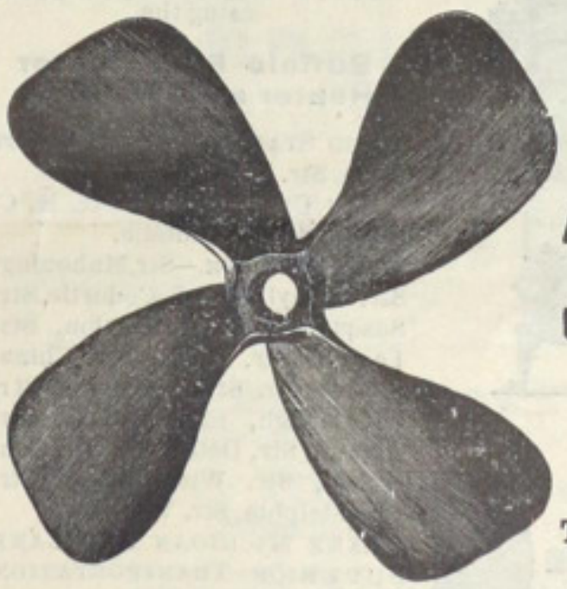
THE PITTSBURGH AND CHICAGO GAS COAL CO.
MINERS AND SHIPPERS OF
Pittsburgh and Youghiogheny Coal.
Fuel Docks West Side of Main River, Cleveland, Ohio, just above Main St. Bridge.
Latest equipment for rapid fueling of Steamers at all hours, day or night.
Fuel Lighter 300 tons capacity; buckets 2½ tons capacity.
Telephone { Office 1888. Fuel Dock 1590. Ore Dock, 2413.
J. A. DONALDSON, Agent, 420-421 Perry-Payne Building.



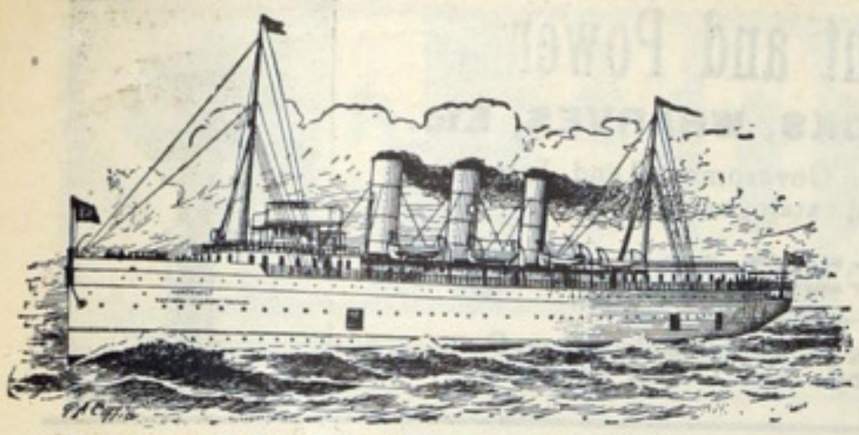
ONE OF THESE BINDERS
that will hold 52 NUMBERS of the
MARINE REVIEW,
Will be mailed to any address on receipt of $1.
MARINE REVIEW...
409 Perry-Payne Bldg.,
CLEVELAND, O.

H. A. BARR, PRESIDENT, Escanaba. F. H. VAN CLEVE, SEC. Escanaba. CAPT. GEO. BARTLEY, SUPT. Escanaba.
ESCANABA TOWING & WRECKING CO., Escanaba, Mich.
Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready
TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.
CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction

H. G. TROUT,
KING IRON WORKS,
BUFFALO, N. Y.
MANUFACTURERS OF
TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT And STEEPLE COMPOUND MARINE ENGINES,
High and Low Pressure Engines, Sectional. Propeller, Tug and Yacht Wheels.
Cowles Aluminum and Manganese Bronze Propeller Wheels.



These Wheels are noted for their extra speed, towing power and proportionate saving of coal.
PRICES QUOTED ON APPLICATION.



RAPID FUELING DOCKS, DETROIT RIVER.

JAMES GRAHAM & CO.,

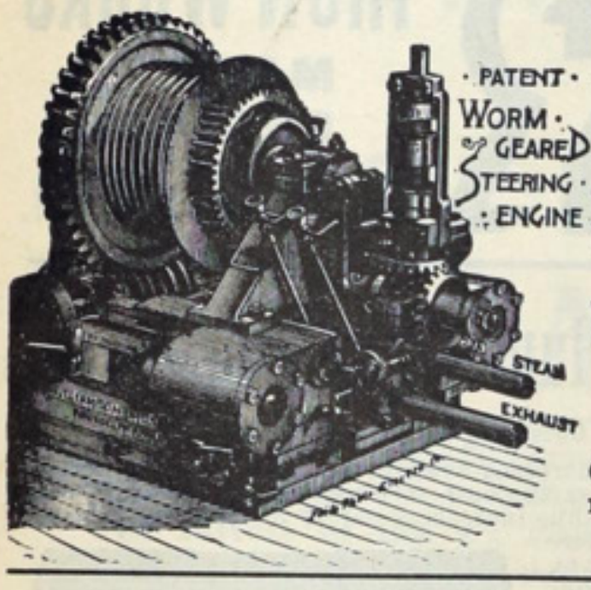
Foot Twenty-first St., Detroit, Below Routes of Passenger and Car Ferry Lines.

Pockets and Chutes arranged for different types of vessels.

BEST STEAM COAL. Large Supplies and every effort to give dispatch, day and night. Wide stretch of river for tows, and plenty of water at dock at all times.

Shippers of Coal by Rail and Water.

Office 1005 Chamber of Commerce. Phone 2083.



Hoisting and Steering ENGINES.

With either Frictional, Spur or Worm Gear of various patterns to suit all purposes.

Williamson Bros.

Richmond and York Sts.
PHILADELPHIA, PA.

Over 150 of the largest and most modern lake steamers have our steerers.

Farrell's Patent Self-Detaching Hook for Davitt Tackle

Prevents the up-setting of the boat in lowering same in a heavy sea, by operating same from the deck, instantaneously disengaging the fall from the boat at the proper moment when it reaches the water.

BAGNALL-LOUD BLOCK CO.

162 Commercial Street, BOSTON, MASS.

THE W. L. SCOTT CO.

Wholesale Dealers in

Shamokin, Wilkesbarre, and Hazleton-Lehigh

COALS.

Mansfield Steam Coal.

FUELING VESSELS a specialty, either from dock or steam scow Mansfield, capacity 300 tons, in buckets, which gives quick dispatch. Boats coaled day or night. Docks lighted with electricity and equipped with steam derricks.

Fueling Office at Canal Dock, ERIE, PA.

The Rochester & Pittsburgh Coal & Iron Co.

REYNOLDSVILLE COAL.

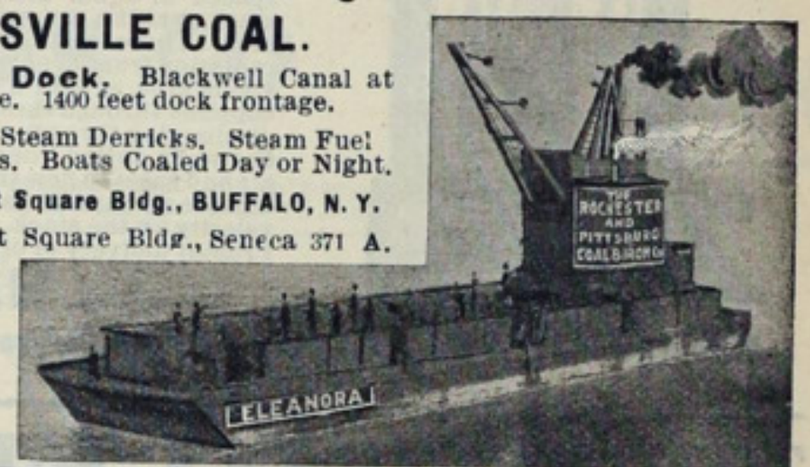
Steamboat Fuel Dock. Blackwell Canal at Michigan St. Bridge. 1400 feet dock frontage.

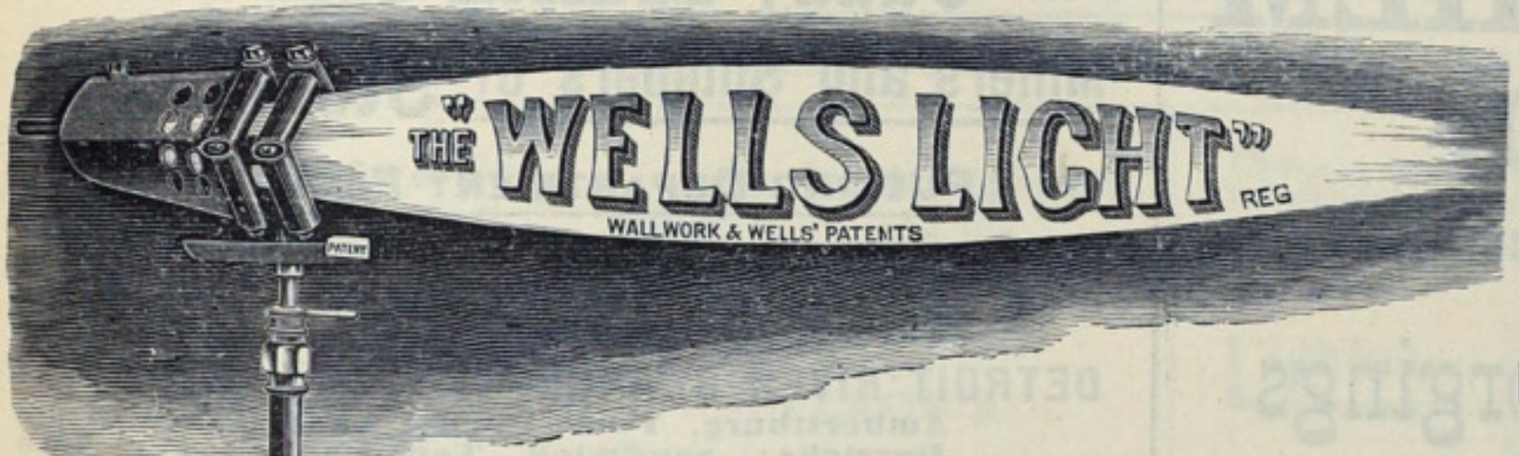
Steam Elevator and 4 Steam Derricks. Steam Fuel Scow, Capacity 550 Tons. Boats Coaled Day or Night.

OFFICE: 694 Ellicott Square Bldg., BUFFALO, N. Y.

TELEPHONES: Ellicott Square Bldg., Seneca 371 A. Dock, Seneca 371 D.

WM. H. HAZEN,
Dock Superintendent.





10,000 IN USE.

Unaffected by Weather.

Portable, Self Contained.

800 to 4000 Candle Power from KEROSENE OIL.

Especially adapted for Contractors, Quarries, Shovels, Railroad Construction, Dredges, Bridge and Dock Builders, Water-Works, Brick Yards and Coal Docks.

400 RAILROADS and over **300** CONTRACTORS now use the WELLS LIGHT.

The Wells Light Mfg. Co.

EDWARD ROBINSON, Sole Proprietor.

46 Washington Street, NEW YORK.

MARINE VALVE OIL FOR INTERNAL LUBRICATION. RENOWN ENGINE OIL FOR EXTERNAL LUBRICATION

Marine Valve, Renown Engine, Eldorado Engine, Crank Case, Victor Signal, Dark Lubricating, Mineral Seal, Head Light, Artic Cup Greases, and Lard Oils.

— CARRIED IN STOCK AT THE —

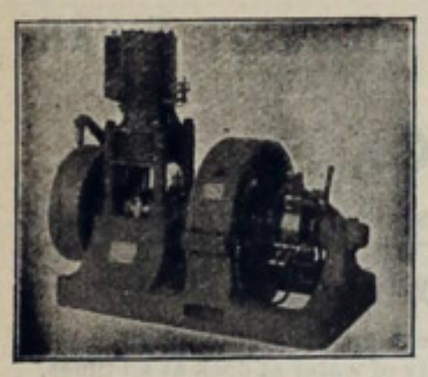
STANDARD OIL COMPANY'S MARINE DEPOT,

TELEPHONE 77. **123 River Street, CLEVELAND, O.** MAIN OFFICE TELEPHONE 682.

ALSO FOR SALE BY **STANDARD OIL COMPANY,**

Chicago, Ill., No. 5 Wabash Ave.
Racine, Wis.
Milwaukee, Wis., Broadway & Mason.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.
Marinette, Wis.
Oshkosh, Wis,
Duluth, Minn,
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.
Buffalo, N. Y.
Sault Ste. Marie, Mich.
West Bay City, Mich., M.C.Ry. & 10th St
Saginaw, Mich., Eighth & Sears Sts.
Detroit, Mich., 46 Jefferson.
Toledo, O., Summit & Monroe Sts.

ATLANTIC REFINING COMPANY, French & 16th Sts., Erie, Pa.
D. ROBERSON, Port Huron, Mich.
W. S. MCKINNON, Ashtabula Harbor, O.
HULL & RAND, Huron, O.
EDWARD BRAMMALL, Bnton Harbor, Mich.
BABY & DALE, St. Clair, Mich.
N. C. ALTEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.
A. H. MCGONAGIL, South Chicago, Ill.
MARINE SUPPLY CO., Fairport, O.
F. KRANZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY CO., Toledo O



Complete Electric Plants for Light and Power

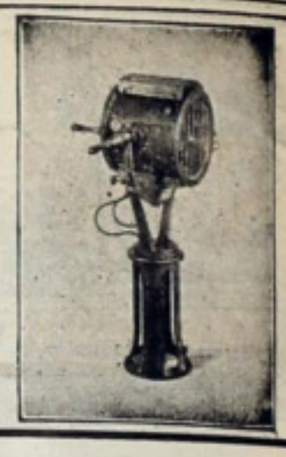
On STEAMSHIPS, WHALEBACKS, YACHTS, DOCKS, WHARVES, Etc.

Our system is complete in every detail. All our appliances are made to Governmental and Insurance requirements and are perfect. Write for prices and catalogues.

General Electric Company.

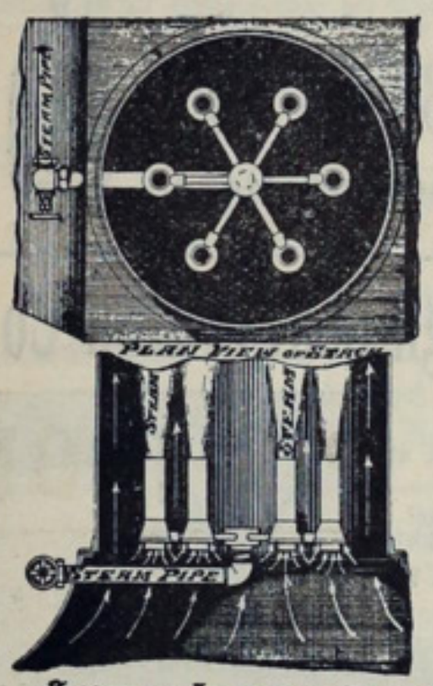
SALES OFFICES

Schenectady, N. Y. Chicago, Ill. Detroit, Mich. Buffalo, N. Y. Columbus, O.
Boston, Mass. Philadelphia, Pa. Baltimore, Md. Portland, Ore. San Francisco, Cal.
New York, N. Y. New Orleans, La.



FRONTIER IRON WORKS

MARINE ENGINES,
DETROIT, MICH.



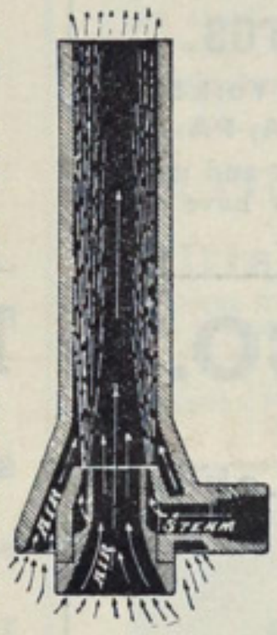
SECTION VIEW OF STACK SHOWING JET IN OPERATION.

The Annular Steam Jet

For Smoke Stacks of Steam Boilers.

Acknowledged as the most powerful and economical jet on the market, giving results equal to forced draft with fan. Works well at all steam pressures.

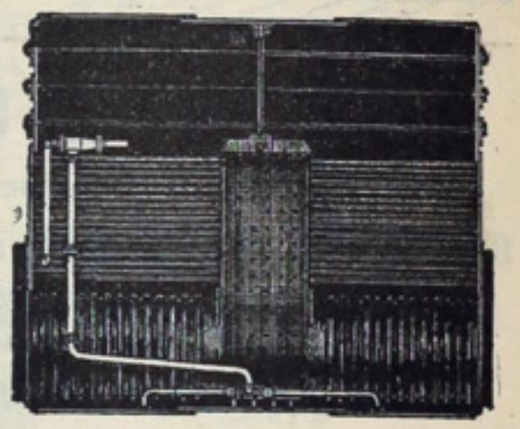
In use on the fast Sound Steamer City of Lowell and famous Delaware River Strs. City of Chester and Brandywine, together with several Cuban and Mexican Strs. Also many Steamships, Side Wheel and Propeller, Lake, Bay and River Strs. Cut on the right shows sectional view of castings, which are spaced at equal distances throughout the stack, making an equal subdivision of its area. These castings are attached to pipes radiating from a central casting attached to steam pipe, as shown on the left. Steam is supplied through these pipes to each casting discharging through an annular opening, as shown by dotted lines, causing a current of air and gases to flow through the central and outside air passages, and discharge at a high velocity up the stack, as shown by arrows. Prompt delivery of orders guaranteed.



The Equilibrium Circulator

For Heating and Circulating the Water in Steam Boilers.

Equalizes expansion and increases evaporation, thereby saving coal and preventing leaks, thus saving cost of repairs. Prevents foaming or priming and pitting, thus increasing safety and prolonging life of boiler. In use on the International Nav'n Co's Steamers Paris, Southwark, Pennsylvania and Illinois; Steam Ships Gloucester and Howard of Merch'ts and Miners Line; Sound Steamers City of Lowell and Richard Peck; fishing steamer Al. Foster; Delaware River Steamers City of Chester and Brandywine; and many steam yachts and tug boats, giving remarkable results. Used by Harlan & Hollingsworth Co., Bath Iron Works, Maryland Steel Co., and others. Castings carried in stock for prompt delivery.



Circulating Apparatus in Boilers of the Ocean Greyhound Str. Paris.

Address **H. BLOOMSBURG & CO.,**
Main Office, Newport News, Va. Branch Office, 818 Adams St., Wilmington, Del.

THE BETHLEHEM IRON CO.

Works & Principal Office, **South Bethlehem, Penn.**

Marine Engine Forgings

of all descriptions, made either SOLID or HOLLOW from Fluid-Compressed Hydraulic-Forged Open Hearth Steel.

Ship-Plates. Boiler-Plates. Tank-Plates.

NEW YORK OFFICE, - - 100 Broadway.
PHILADELPHIA OFFICE, - 421 Chestnut St.
CHICAGO OFFICE, - - Marquette Bldg.

The United States Standard Register of Shipping.

Providing the only Standard Classification based on Construction Rules Designed for Lake Vessels.
Classed Vessels Receive the Lowest Rates of Insurance.

SURVEYORS.

SINCLAIR STUART, Surveyor of Iron and Steel Construction and Engineer Surveyor.

.....Surveyor for District comprising Lakes Superior, Michigan and Huron and Lake Erie, as far East as, and including Cleveland, O.

EDWARD GASKIN, Potter Building, Main Street, Buffalo, N. Y., Surveyor for District comprising Lake Ontario and Lake Erie, as far West as, but not including Cleveland, O.

Application for survey of vessels and subscriptions to Register Book will be received by the surveyors or at the office of

The United States Standard Steamship Owners', Builders' & Underwriters' Ass'n, Ltd.
Post Building, 16 and 18 Exchange Place, . NEW YORK.

Cuddy-Mullen Coal Co.

Miners and Shippers of **Steam Coal.**

FUELING DEPARTMENT FACILITIES:

CLEVELAND HARBOR—
Car Dumper; Eight Pockets 1,000 tons capacity; Three Steam Derricks; Lighter.

DETROIT RIVER BRANCH—
Amherstburg, Four Pockets and Three Steam Derricks; Sandwich, Ten Pockets and Two Steam Derricks.

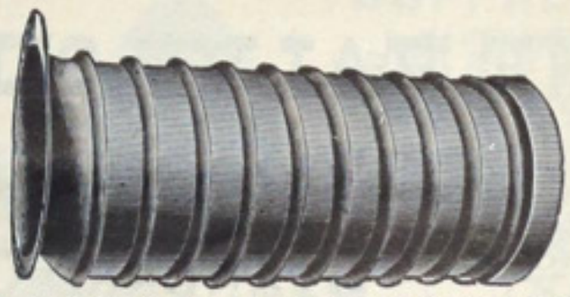
SAULT RIVER BRANCH—
Two Docks at Detour (formerly known as the Anthony and Watson Docks) Equipped with Pockets and Steam Derricks.

Good Coal; Courteous Attention; Quick Dispatch.

General Offices: Perry-Payne Bldg., Cleveland, O.

PURVES' RIBBED STEEL BOILER FURNACE FLUE.

BACK END.



FRONT END.

With this style of Furnace Flue, the rivets at the "back end" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any other part of the boiler. No smith work is required to fit it in a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of Flue has been in use six years without a single complaint.

Over 16,000 of Purves' Ribbed Steel Furnace Flues in successful use in Marine Boilers.

ELLIS & EAVES SYSTEM OF INDUCED OR SUCTION DRAFT.

CHARLES W. WHITNEY,
Sole Agent for the United States and Canada,
Bowling Green Building, 5 to 11 Broadway, New York City.

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

THE BABCOCK & WILCOX CO.

29 CORTLAND STREET,
NEW YORK.

FORGED STEEL WATER-TUBE MARINE BOILER,

Light, durable, easily cleaned and inspected. Only straight tubes are used.
The largest cargoes on the Lakes are carried by steamers using BABCOCK & WILCOX boilers.
The fastest of the six composite Guaboats recently constructed for the U. S N. (MARIETTA and ANNAPOLIS) are equipped with these boilers.
Boilers also ordered for U. S. N. CHICAGO and ATLANTA.

BAR IRON — THE BOURNE-FULLER CO. — PIG IRON

CLEVELAND, O.

SHIP PLATES, BOILER PLATES,
ANGLES, BEAMS, CHANNELS, BARS,
BOAT SPIKES, CLINCH RINGS,

SALES AGENTS:

THE CAMBRIA IRON CO.

Mfrs. of Open Hearth and Bessemer Steel.

De Grauw, Aymar & Co.,
34-35 South Street,
NEW YORK, N. Y.

Sole Selling Agents in the United States for

TYZACK'S
STOCKLESS ANCHORS

Over 100 of these Anchors on Lake Vessels.

DETROIT SHEET METAL AND BRASS WORKS

No. 64-66-68-70-72 ORLEANS STREET, DETROIT, MICH.

Jobbers of..... Pipe, Valves, Fittings. Pack ng, Oil and Engineers Suplies.

Contractors for High Class Steam Fitting, Steam Heating, Plumbing, Copper Work, and all Classes of Sheet Metal Work.

Manufacturers of Clark's Patent Metallic Life Raft, Side Lights, Marine Hardware, Hurricane, Cabin and Platform Lamps, Trip Gongs, etc.

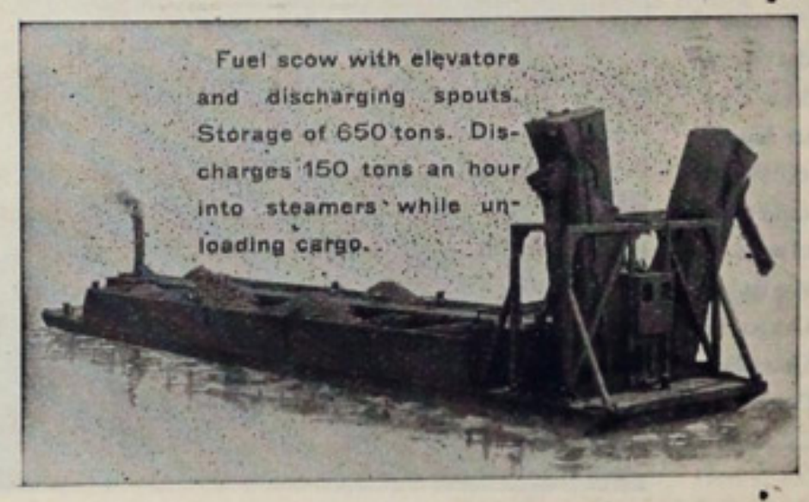
Agents for..... Laidlaw - Dunn - Gordon Steam Pumps, Warren Webster's Specialties, and Buffalo Forge Co.'s Fans, Engines and Heaters.

Engineers can be waited on promptly day or night.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter Carrying Different Grades at all Times.


Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

M. A. HANNA & CO.,

Main Office, Perry-Payne Bldg., Cleveland. Miners and Shippers.

THE GEO. F. BLAKE MFG. CO.

AIR PUMP ON U.S. CRUISER NEW YORK.

BUILDERS OF

MARINE PUMPS

Single and Duplex Pumps for Boiler Feed, Fire or Bilge Service—Vertical and Horizontal.
Vertical and Horizontal Pumps, Air Pumps for Surface and Jet Condensers.

95 and 97 Liberty St., NEW YORK.

PEERLESS RUBBER MFG. CO.

16 Warren Street, NEW YORK.

ALWAYS TIGHT.

—

LEAVES THE STEM CLEAN.

HERCULES

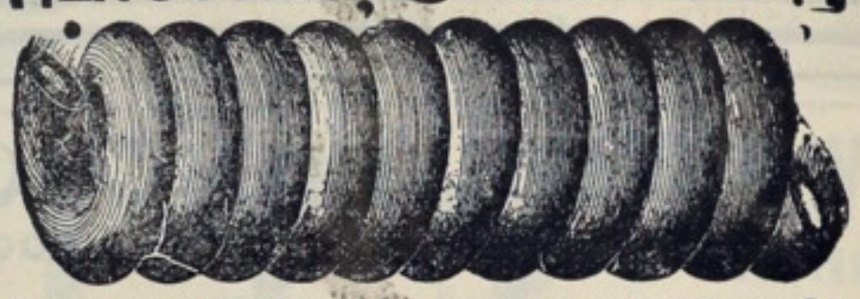
PEERLESS RUBBER M'F'G CO. N.Y.

STOP VALVE PACKING

MADE BOTH STRAIGHT AND SPIRAL.

PUT UP IN BOXES.

HERCULES COMBINATION



METALLIC STOP VALVE PACKING

WRITE US FOR TESTIMONIALS.

16-24 Woodward Avenue, DETROIT, MICH.

193-195 Bank Street, CLEVELAND, O.

202-210 S. Water Street, CHICAGO, ILL.

The Cleveland Dry Dock Co.

148 Elm St., Cleveland, O.

Telephone 1616.
Resid. 'Phone 3634.

REPAIRING A SPECIALTY.

Dimensions of Dock:

Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN, Sec'y & Mgr.

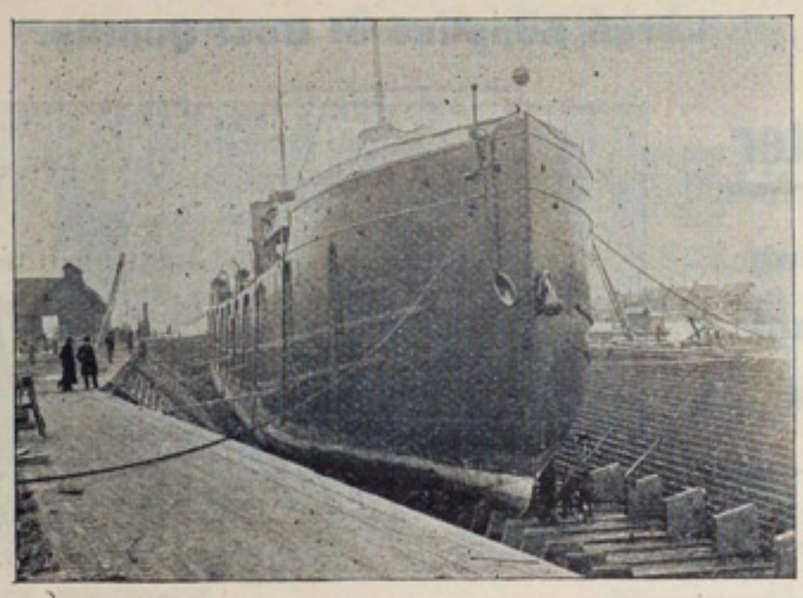
AMERICAN STEEL BARGE CO.

STEEL and METAL SHIPS

Of all classss built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.

Plates & Material Always on hand to Repair all kinds of Metal Ships in Shortest Time.



Best Quality of Oak instock for Repairing Wooden Vessels of all Classes

SIZE OF DOCK.

Length, extreme.....537 feet.		Entrance, Top.....55 feet 9 in	
Breadth, Top 90	" 4 in.	Entrance, Bottom.....50	"
Breadth, Bottom 52	"	Depth over Sills 18	"

LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propellor Wheels in stock at Dry Dock.

H. C. BURRELL

MARINE REPORTER, DETROIT.

Small boat on the river at all hours of the day and night. Let us give you prices on delivery of orders and other business at Detroit. Engineers and firemen, mates and deck hands, furnished on short notice.

Office Foot of Woodward Ave. **Tel. Main 46 B.**

COAL

STANLEY B SMITH & CO.

OPERATING

SMITH'S COAL DOCK

POCKET FUELING AND LOW DOCK,

DETROIT, MICH.

OFFICES: DETROIT MICH.

LORAIN, OHIO.

OPERATING

LORAIN COAL DOCK

LAKE SHIPPERS OF STEAM COAL.

STEAMBOAT FUELING

DELTA METAL

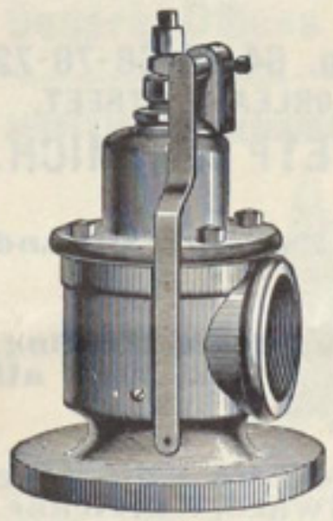
REG TRADE MARKS

"Phosphor-Bronze" DELTA

THE PHOSPHOR BRONZE SMELTING CO. LIMITED,
2200 WASHINGTON AVE., PHILADELPHIA.
"ELEPHANT BRAND PHOSPHOR-BRONZE"
INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.
—DELTA METAL—
CASTINGS. STAMPINGS AND FORGINGS.
ORIGINAL AND SOLE MAKERS IN THE U.S.

PROPELLERS.

CROSBY STEAM GAGE AND VALVE CO.



CROSBY POP SAFETY VALVES. Locomotive, Marine and Stationery.
CROSBY WATER RELIEF VALVES, for Pumps, Hydrants, etc.
CROSBY IMPROVED STEAM PRESSURE GAGES.
CROSBY STEAM ENGINE INDICATORS, with Sargent's Electrical Attachment for taking any number of Diagrams simultaneously.

The Original SINGLE BELL CHIME WHISTLES.
BRANDEN PUMP VALVES; rubber with wire-coil insertion.
BOSWORTH FEED-WATER REGULATOR, PATENT GAGE TESTER, and many other specialties in Steam Lines.

Main Office and Works: **Boston, Mass.**

Stores: Boston, New York, Chicago, and London, Eng.

WE WILL REPAIR YOUR STEAM FITTINGS PROMPTLY.

Christian Endeavor Excursion to California—Sleeping car reservations are now made from Chicago via all lines, and all information is given for this wonderfully low rate to California at Nickel Plate city ticket office, 189 Superior street, Cleveland. Call early. 71 June 30